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RESEARCH AND DEVELOPMENT

No. 41

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WORLDWIDE AFFAIRS

BRIEFS

INTERNATIONAL RADIO CONSULTATIVE COMMITTEE--Kyoto Jun 7 KYODO--A total of 350 electricians from 70 countries opened a meeting here Wednesday to study ways to harmonize utilization of their technology on electric waves and establish a new world order in this field. The 14th plenary meeting of the International Radio Consultative Committee (CCIR), a standing advisory organ to the United Nations specialized body of the International Telecommunications Union (ITU), got under way at the Kyoto International Hall. The CCIR general meeting, to last about two weeks, is the first to be held in Japan. The technicians are to take up problems pertaining to laser communications, microwave-using earth-inspecting satellites and other technical innovations at the meeting. The 66-member Japanese delegation to the assembly was led by Masao Hirano, chief of the posts and telecommunications ministry's radio regulatory bureau. [Text] [Tokyo KYODO in English 1032 GMT 7 Jun 78 OW]

CSO: 5500

ARGENTINA

NEW ELECTRONIC COMMUNICATIONS FIRM ANNOUNCED

Buenos Aires LA PRENSA in Spanish 9 May 78 p 12

[Text] The creation of a new firm, PECOMNEC, INC, was announced yesterday at a press conference. It will produce electronic communications equipment.

It is made up of the Perez Company Inc of Argentina which will hold the majority stock, and the Japanese firm Nippon Electric Company. The latter is already known in this country for having provided, in 1973, the 1,400-km long microwave relay between Comodoro Rivadavia and Ushuaia and for having made similar contributions to the 1,200-km long Buenos Aires-Tandil-Mar del Plata-Bahia Blanca network.

It should be pointed out that the greater percentage, in kilometers, of microwave systems installed in this country are currently equipped with NEC products, imported from Japan.

The new PECOM-NEC company intends to participate in the development plans announced by ENTEL, providing electronic automatic exchanges equipped with microwave and multiplex PCM telephones, all produced in this country.

Equipment To Be Produced

Construction of ND-10 and ND-20 type automatic exchanges is planned for this country; they were remodeled for local uses. The first system controlled by a storage program with D-10 type space division, began to be used commercially in 1971 in the principal Japanese cities and now, they can be found operating 150 systems.

The development of microwave systems began in 1955, based essentially on negative feedback techniques and the use of locked-phase detectors and low-noise parametric amplifiers. The result was a wide range of highly sensitive wide-band commercial systems. Microwave communications system via satellite were developed later on.

It should be noted that, in the field of communications, the NEC Company handled 46 percent of total Japanese exports for automatic exchanges, 80 percent for the microwave systems and 67 percent for PCM multiplex systems.

ARGENTINA

BRIEFS

SPANISH ELECTRONIC DELEGATION--A Spanish commercial mission for the electronic industry arrived yesterday to meet with official authorities and representatives of the private sector. The purpose of this meeting was to analyze possible industrial cooperation and technological exchanges. This delegation is sponsored by the Ministry of Commerce, the Commercial Bureau of Spain and the Buenos Aires Spanish Chamber of Commerce. [Text] [Buenos Aires LA PRENSA in Spanish 9 May 78 p 12] 6857

CSO: 5500

CUBAN COMMUNICATIONS DEVELOPMENTS REPORTED

Color Television System Described

Havana VERDE OLIVO in Spanish 23 Apr 78 pp 42-45

[Text] Night falls and a group of boys with a veritable arsenal of whips, bows and swords, let their imagination run wild on the fierce battle that approaches. Suddenly, and to the shout of [word missing] the adventure began, the "good guys" and the "bad guys" ran to take a place before the TV.

Its Origins

Television, that magnificent invention, which has so many different uses in our time, is not, as many think, such a recent discovery. Its roots go back beyond our century to the moment when sound was made to travel through space, an event which aroused in men the desire to do the same thing with pictures. However, the realization of this idea was not an easy process.

In 1843, a Scots watchmaker, Alexander Bain, discovered in the breakup of images into many points of variable light, the possibility of transforming them into electrical impulses and reproducing the image at a distance through a universal process.

The first transmission was made by Blakewell in 1847. It was more a matter of telephotography than television. The discovery by May of the photo-electric cell in 1873, was another incalculable contribution to its development.

An event took place then which gave a practical solution to the transmission of an image. Paul Nipkow thought of a process which consisted in scanning the image using a disk which contained a number of holes in a spiral manner, which characteristic did not allow any part of the image to remain unscanned.

This process in its time clashed with the obstacle that the disk used had to have a diameter of two or three meters, necessary for obtaining an image of acceptable size.

After Nipkow, other systems were used but without attaining any significant advances. It was not until the advent of cathode-ray tubes that monochromatic television (black and white) began the new phase of development which allowed it to reach the degree of perfection it has today.

The problem posed by television at the beginning because it had to use the same channel for transmitting the information corresponding to the luminosity of all the points of an image, is now being resolved by the same system used by Nipkow, with the difference that he used an electromechanical procedure and today it is done by electronic means.

Television began to go public shortly before World War II, and during the war it made significant progress. However, from its beginning, it suffered from one defect: it lacked color in its pictures.

Men of science undertook the task of obtaining a naturalness in three aspects: form, size and color. The first two they had, the third, was obtained thanks to the joint work of scientists, engineers, and researchers.

Color Television

The foundations of color or polychromatic television, are based on research done on the nature and composition of light, as well as the perception of colors by eyesight.

Who has not admired the beauty of the rainbow after a rain? This phenomenon not only awakened the esthetic curiosities of man but also his study. In it are clearly contained the six colors of the spectrum visible to the human eye. Within this spectrum may be found the so-called primary colors: red, green [as published] and blue, which on being mixed indiscriminately maintain the quality of producing the color white and a gamut of different colors.

This peculiarity is used by polychromatic television because that mixture is the best for the emission of images in colors.

With these elements and the advances reached in monochromatic transmission, the study of the prerequisites color television should have been begun.

As a basic question, the compatibility of the systems was established. This means that the signal emitted by the transmitter must be reproduced similarly in either black and white or color television receivers. This requirement was due to factors of technical and economic nature. It was a question which necessarily implied maintaining the color television receiver within the same specifications as those used up to the time, the same vertical and horizontal sweep frequencies, bandwidth, modulation and so forth.

Thus, it was decided, after several experiments, to transmit a signal which had the same characteristics as that used by black and white television.

This signal, called brightness, is applied on the picture tube of both receivers for the purpose of reproducing programs in black and white and with the main objective of making the color and black and white systems compatible.

In view of this situation, it was necessary to find another signal capable of transmitting color. Thus, the color signal emerged. For this reason, the video signal put on the air by color TV is made up of two signals: the one called luminescence, which transmits information on the brilliance of each point of the picture, and the one called chromaticism, used to transmit the information on the value of primary colors in each point of the picture.

Its Introduction in Cuba

Television was introduced in our country in 1949-1950, most of the equipment being old. As the years passed it became obsolete. In 1968, negotiations began for replacing this equipment with modern technology.

The Soviet Union once more made an extraordinary effort to satisfy our needs in that area. As an example, it is enough to point to the change in an assembly line in the industry to adapt its production to the standards used in Cuba.

Installation of the first equipment was begun in 1974. This meant a great advance for our television, which entered a solid-state technology, that is, it went from tubes to transistors.

With more solid foundations, conditions now presented themselves for the establishment of color television.

Worldwide, color television works with three different systems: in Europe, the Pal and the SECAM, and the NTSC in America. Each of them has its own characteristics which distinguish it from the others. In turn, all of them are based on common principles and their introduction into each country is due, among other things, to the existing electrical service. Cuban Broadcasting Institute [ICR] technicians, the Ministry of Communications, and other organisms made an analysis to determine the most suited for Cuba.

The study centered on SECAM and the NTSC. The first confronted the problem of having a different electrical network than ours and its use would mean a double transmission: the one in color on one system and black and white in the present system. This would be a long and complicated process because it would be necessary to adapt the 50 cycle system to one of 60 cycles.

Thus, the conclusion was reached to use the NTSC, which solved these problems because it allows programming in color to be received in black and

white in the television receivers existing in the country, it also being possible to use the transmitters we already had by making some modifications.

It is well to point out that color entered fully into our screens in 1976. Its establishment required a great effort by the country to be able to provide this service to the people because of the very expensive equipment of high technology it requires.

Up to this time, our color television has one remote control truck, a control room, television-moving picture room, a standard converter, a slow motion camera, and videotape equipment. All this equipment was purchased in Japan, it being at this time of the most modern and advanced technology on the market.

The color television receivers have been distributed to public use centers, social clubs, farms, schools, stores, large industries, hotels and so forth for those who desire to see these programs.

Master Control or Control Room

The control room is a highly technical complex, whose function it is to route various signals and send them to the microwave system of the Ministry of Communications, although it is still operating as a sub-control. It is organized in such a manner that it can handle 26 received signals from different sources, such as television moving pictures, video tape, remote control and so forth.

When we enter it, our attention is attracted by its brilliant walls covered with an acoustical material with glass fibers for insulating the cabin thermically as well as acoustically. A requirement before entering the room, is a change of shoes to prevent the entry of dust. Under the false floor are the many cables used there, which provides more room for the operators and safety for the equipment.

The command module, which is a sort of large console, has two positions operated by a technician and a shift engineer. "From here, with the help of the monitors, we can detect the quality of the transmission, explained engineer Isidora Leal, who at that time was operating the controls. Through the various buttons, the operator can check each of the signals being received without affecting that which is on the air. We also have an oscilloscope and a vectorscope which allows us to check the color, signal quality and other parameters of it electronically. All the equipment of master control is transistorized and with logical circuits."

Also in the room there is a clock system which is the slave of an international Greenwich mean time system. It is very exact and the future it is planned to provide it as a national time signal.

Next, there is the installation of three television moving picture installations. Consisting of three racks, they have 16 and 35 millimeter projectors, slide drums and their respective color cameras. The systems can work independently or pass control to a console table where a technician operates all the equipment at once. There is also a Cinesinc in this place. It is a machine, which through magnetic tapes, is capable of reproducing the narration synchronized with the picture of those films with separate magnetic sound.

In a small adjoining room, there is one of the most recent acquisitions: a standards converter. It is a complex piece of equipment and very important because of the work it performs. Through it, the three color systems: SECAM, PAL and NTSC can be made compatible. With this equipment, any of the other two systems can be converted electronically without any detriment with respect to color.

In this way, if one wishes to transmit a program produced in Cuba to the Soviet Union, the signal is passed through the converter, which processes it and instantly changes it into the standard or system used in that country, and from there it is sent to the Jaruco Earth Station from where it is transmitted via satellite to the USSR or viceversa.

Its utilization allows various political, artistic and sports programs received from the socialist countries to be provided to the people with great clarity, which increases the variety of our programming.

Other equipment which contributes to maintaining the quality of our color television, are the two professional videotape machines which record, edit, and transmit on the NTSC and SECAM systems.

The remote control van plays, at this time, a highly important role in the preparation of programming in color because it is used in outdoor takes as well as in the studios. It has four cameras, which are characterized by their great reliability and optimum color quality, and it can record the program directly on the two professional video-tape machines installed in the van.

From the central panel, an operator controls the signal which is being recorded or going out on the air through the microwave link equipment.

In a small compartment of the truck are the working positions of the program director and the sound and picture producers, the latter a new position introduced in color TV due to the complexity of the equipment.

With the image commutator, the producer can mix cameras and produce 35 special effects, which introduce different geometric figures into the image. Another possibility it provides is that of cutting out or inserting letters and figures into the picture, including persons, a very good resource for preparing a more finished image with fewer resources.

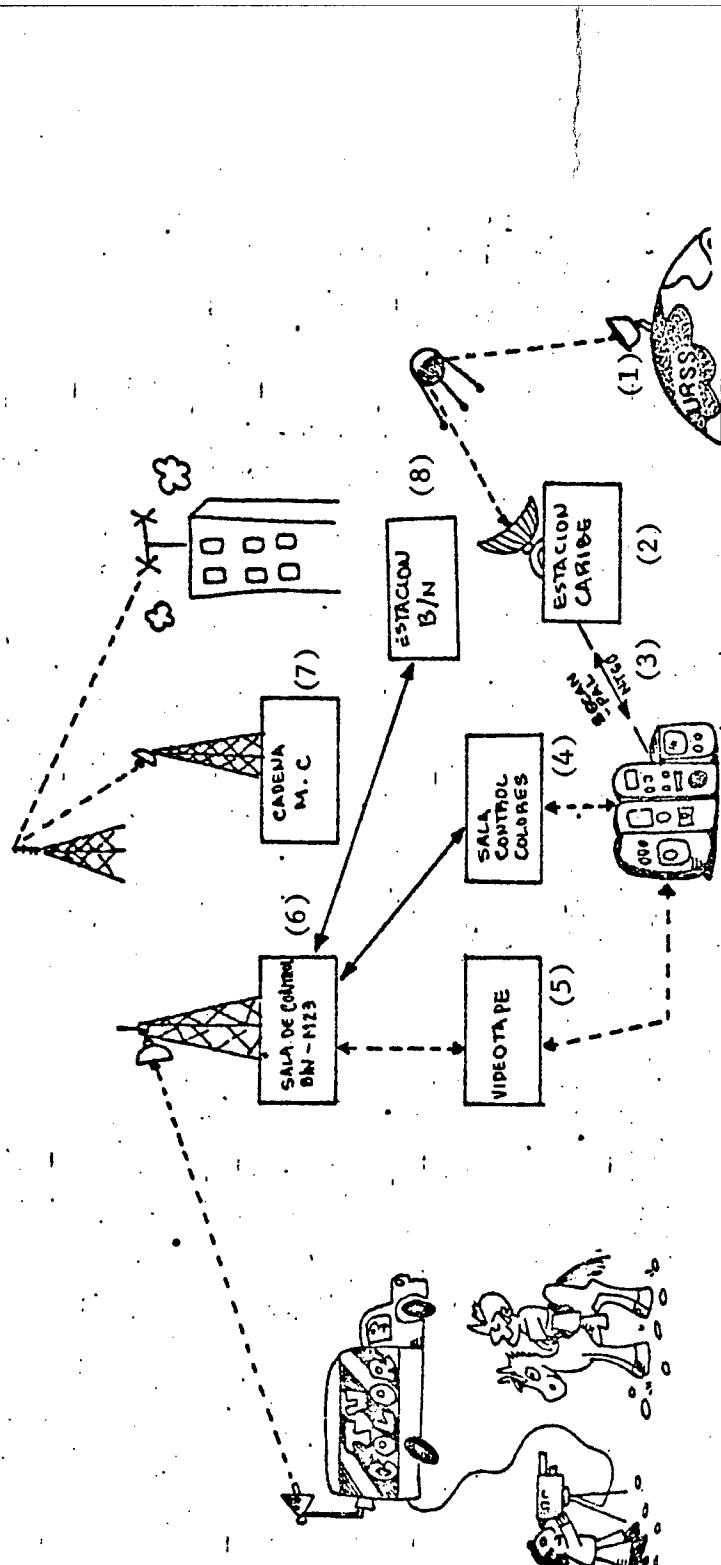
It also has a piece of equipment called background color with which signs in different colors can be placed, and as its name indicates, it is possible to vary the background color.

The audio equipment in the truck can receive the sound of up to 12 microphones.

A reality

Only a few years ago, to speak of color TV appeared as a fairytale, however, the present teaches us that with effort and work dreams can become reality. Undoubtedly, many things have been accomplished in a short time, but our engineers and technicians, producers, directors, artists, cameramen, and so forth remain alert. Color is demanding, and a monolithic teamwork is required, because the slightest carelessness in a setting, a change in brightness, or poor makeup, is made prominent by color.

With dedication and study, new experiences are being accumulated and difficulties overcome. The sum of achievements is increasing and we are sure that color video will continue to develope more and more in our television.



Key:

1. USSR
2. Caribe Station
3. SECAM, PAL, NTSC.
4. Color Control Room
5. videotape
6. Black and White Control Room - M23
7. Microwave network
8. Black and White Station.

PHOTO CAPTIONS

1. p.43 Television-moving picture equipment located in three racks can work independently or pass the controls to a console table where a technician operates all the equipment at once.
2. p.44 One of the most recent acquisitions, the standards converter, can convert one system to any of the other two electronically without detriment to color.

p.44 In the command module, the shift engineer checks the film being recorded on videotape without affecting the signal which is on the air.

p.44 The professional videotape machines acquired for color programing, record, edit and transmit in the NTSC and SECAM systems.

p.44 In the interior of the remote control truck, technicians work at recording a program with the videotape machines.

p.45 This is the way color television programs which come to your home are prepared.

p.45 The modern cameras are characterized by their great reliability and optimum color quality.

p.45 The color camera, unlike the black and white, has three tubes which receive the image in the three primary colors (red, green [as published] and blue, and it combines them. This mixture reaches the television receivers and is broken up again into the three aforementioned colors, reflected as small points on the screen. The human eye once more combines these colors and receives the image as it was transmitted originally.

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Telecommunications Laboratory Described

Havana JUVENTUD TECNICA in Spanish Aug 77 pp 10-15

[Text] A masterly and very well-studied decision on the election of the most modern patents, together with an intrepid development plan for the construction of equipment with our own means, and the concentration of all the forces in very reduced areas of specialization, have contributed to the positive result of the central telecommunications laboratory.

The development of modern systems and new types of equipment and apparatus is done by this center, which is dedicated to the amplification and perfectioning of available technical capabilities. At the same time, it is also destined for the research and development of new systems, utilization of the most recent achievements in techniques and technology applied to telecommunications.

On Kilometer 14.5 on Rancho Boyeros Avenue, is found the central telecommunications laboratory, which is the development center of the Ministry of Communications.

It has 12 years of uninterrupted experience, during which it has been increasing its technical capabilities progressively until it has become a modern institution. It has equipment and instruments, which together with young personnel (the majority university graduates, technicians and skilled workers), allows it to achieve the many successes it has had in the research and development work carried out there.

The main objective of this laboratory is to serve as a technical support to the Ministry of Communications in its effort for continuing to improve the quality of communications and improve the operation and maintenance of existing systems.

For this purpose, a plan of basic problems to be resolved during the 1976-80 5-year period has been established. The plan responds to the specific needs of our country and for this reason collaboration with other institutions such as the Electronic Industry Enterprise and the universities is foreseen.

The main work being done consists of the development of equipment and professional devices for telecommunications, climate tests of materials, equipment and electronic components, measurements and studies of telecommunications systems, installed or newly acquired, as well as the manufacture of quartz frequency crystals.

The laboratory has a technical subdirectorate, a technological subdirectorate and an administrative section.

In the technical subdirectorate, designs for new equipment are made and operational tests and experimental installation tests are made. It has the departments of radio links, data transmission and telephony. It also has a computer center equipped with a CID-201 B, nationally manufactured computer.

The other subdirectorate provides the technology of the other equipment to be produced and has areas specialized in construction of prototypes, technological design, environmental engineering and instrumentation.

Since 1974, a plan of the United Nations Development Program has been under way whereby the laboratory has been equipped with the instruments and equipment necessary in the machine shops, radio link laboratory and the telephony laboratory, among others. Due to the success in the execution of this program, which led to concrete accomplishments in equipment and studies made, as of 1977, its second phase is being executed.

Likewise, a large number of equipment and devices have been designed and built, which were introduced successfully into the telecommunications system. Some of them are:

A 40 Mhz modulator for 120 telephone channels destined to replace obsolete tube modules on the microwave trunk network.

Radio broadcast program amplifier destined to replace deficient equipment. It amplifies programs transmitted to the entire nation on telephone lines with great clarity.

Switchboard for telephone switching for internal communications of up to 10 extensions.

Modem of 600/1200 bauds for the transmission of data on telephone links.

Error corrector for the transmission of data up to a speed of 300 bauds.

Work is going on for the development of other equipment, among which are:

Auxiliary radio equipment with 24 telephone channels.

Modem of 200 bauds for the transmission of data through telephone links.

System of telecontrol and telemetry for radiobroadcasting transmitting stations.

Telephone multiplex of low capacity for rural use.

The Youth Technical Brigade [BTG]

The BTG of this center consists of 42 youths, three helpers and two technical writers. Due to the characteristics of the laboratory, almost all its members have some technical skill: engineers, college graduates, telecommunications technicians, draftsmen, and skilled workers.

This brigade works in coordination with the directorate. Its tasks are primarily at the request of the directorate depending on the needs of the organism, and it has the material support of the administration of the center.

"Although our brigade was recently created," says Carlos Hernandez, its chairman, "we have accomplished the redistribution of electrical energy and the lighting of our center. This work was evaluated as 'Good' by the directorate and the administration. A telephone switchboard with 10 subscribers was also designed and built by a group consisting mainly of members of the brigade."

Carlos also refers to the overfulfillment of the goal of filling 1,000 polyethylene bags with tree seedlings as part of the activities for the 11th World Youth and Student Festival.

Likewise, other work was accomplished, by the members of the brigade as well as by those who work with the brigade. The latter contribute their work experience for the better progress of the tasks inherent to the center, such as the creation of an internal bulletin in the laboratory, the acoustics in the activities room, the reconstruction of a grass cutter, as well as other work which results from this type of cooperation. The brigade members also take part in a Scientific-technical Interest Club made up of 25 students of the Lenin Vocational School.

That is why, in their future plans, aside from the work ordered by the directorate of the central telecommunications laboratory, they contemplate other work which results from the initiative of the brigade members and which will also be of technical interest and economic importance for the Ministry of Communications and the country in general.

PHOTO CAPTIONS

1. p.11 Measurement of frequency response of a filter through the use of a sweep generator.
2. p.11 Ernesto Morejon, technical operator, makes adjustments and measurements in analog circuits (modulators and demodulators).
3. p.12 The operator of the computer, Teresa de la Pena, made reliability studies in the department of environmental engineering.
4. p.12 Telephone measuring equipment. It measures the electro-acoustic characteristics of telephonic equipment.
4. p.13 Telephone panel for internal communications developed in this laboratory. Of practical use in Junior High Farming Schools, polyclinics, offices, shops and so forth.
5. p.13 Error corrector for data transmission TELDAX-200, developed in this laboratory.
5. p.14 Design of printed circuit for masters.

6. p.15 Carlos Hernandez, president of the BTJ and with a degree in physics.

p.16 The module for the plating of connectors serves to impose the metallic covering on printed boards through a chemical precipitation process. The construction of this equipment in the laboratory saved our country \$15,000.

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CSO: 5500

BAHRAINI, SAUDI ARABIAN SATELLITE PROJECTS REPORTED

Beirut EVENTS in English 2 Jun 78 p 29

Text

In today's world of increasingly advanced technology you can either send your message scurrying underground through a maze of computer-operated switching devices, or you can beam it through the air and far across the ocean. The Middle East is an expanding market for companies whose expertise is in developing new town and country grids, and also for firms who specialise in installing earth stations to connect with satellites for international calls and telexes. And contacts in both areas are hard won.

On the satellite front the British firm Cable and Wireless is doing well, even if other British firms have been finding it hard going for ground systems where the Swedish firm L M Ericsson and the Japanese are particularly strong. Cable and Wireless are to install a new large dish satellite earth station in Bahrain in a project that is worth at least several million dollars.

The firm already has one such station in Bahrain, which came into service in 1969 - the first of its kind in the Middle East. But the firm establishment of Bahrain as an offshore banking centre has meant a huge growth of international telephone and telex traffic in and out of the island. The new station will also allow telephone calls to be routed via an Atlantic communications satellite while at present all Bahrain's long-distance calls are routed over the Indian Ocean. Cable and Wireless also have earth stations in the UAE and North Yemen.

Another Arab satellite project is the planned regional system Arabsat, which it is now thought will become operational in the early 1980s. Arabsat, a 21-nation satellite organisation in which Saudi Arabia holds the largest equity share, will revolutionise telecommunications within the region. The main idea is to bring the remote regions of the Arab world into telephone and television contact with the various centres, avoiding the difficulties of laying lines over millions of kilometres of desert sands.

Apart from basic communications the idea is to use Arabsat as a means of spreading education to these remote regions. Several consortia are after the valuable contracts involved in this project, including the MESH consortium of European companies manufacturing satellite equipment, led by British Aerospace. ■

INTER-AFRICAN AFFAIRS

MALI-ALGERIAN COOPERATION IN TELECOMMUNICATIONS REPORTED

Bamako L'ESSOR in French 15 May 78 p 4

[Text] His Excellency Redha Malek, minister of information and culture, of the Democratic and Popular Republic of Algeria, is expected to arrive in our capital this afternoon on an official 5-day visit at the head of an important delegation.

The visit of the Algerian Minister of Information and Culture falls within the framework of the excellent cooperation which has always existed between two sister countries, both desirous of strengthening their bonds of friendship and faternity.

Algerian-Malian cooperation is a model of success because our two peoples, our two governments, have joined their wills, their human and material resources, in the completion of this work which responds positively and concretely to the recommendations of the OAU.

Algerian-Malian cooperation is being strengthened in sectors other than telecommunications, as our two countries in 1975 signed an agreement covering highway transportation which resulted in the creation of a Joint Algerian-Malian Transport Company.

In the telecommunications sector, the Sullymanbougou Earth Station is most particularly tangible proof of an exemplary model of cooperation. This station was opened in September 1977 by Colonel Zerdini, Algerian minister of communications, in the company of his Malian counterpart, Yava Bagayogo.

This station is of the Standard B type, operates with the special INTELSAT IV (F1) which is in position over the Indian Ocean and has the capability of operating with the INTELSAT IV A over the Atlantic Ocean.

Resigned to provide international telephone, telegraph and telex communications with the capability of receiving two color television channels, the station is equipped with 12 telephone links which may be expanded to 24.

The station is also equipped with:

- Five links including two telephone and three telegraph and telex links to handle communications with Algiers;
- Two service links (telephone-telex).

The Sullymanbougou earth station is only one part of the commitments made by the Democratic and Popular Republic of Algeria to Mali in the telecommunications sector.

In addition to the earth station, Algeria has provided the following:

- Installation of a 1,000-line Telephone Central in Bamako;
- Installation of a 500-line Automatic Telephone Central in Sikasso;
- Supplying of 1,000 telephone sets;
- Training of Malian cadres to handle maintenance of these various installations.

During this official visit to our country by the Algerian Minister of Information and Culture, His Excellency Redha Malek will have the opportunity of evaluating our cultural, artistic and touristic achievements, in addition to meeting his Malian counterpart for a work session. He will also be received by the chief of state, Col Moussa Traore.

In addition to the minister, the Algerian delegation will include four other members, including Messrs Baba [?] Ali, director general of the APS (Algerian Press Service); Laghouati, director general of the RTA (Algerian Radio-Television); Raouraoua, deputy director of Public Relations; Nourredine Ikander, director general of the ANEP (National Publication and Advertising Agency), a team of three persons from the RTA and one newsman from the APS.

His Excellency Malek Redha, who has a degree in philosophy, was a member of the MTLD [Movement for the Triumph of Democratic Liberties] and of the bureau of the General Union of Algerian Students (UGEMA): editor of the newspaper, LA RESISTANCE, at the beginning of the Algerian revolution; director of the newspaper, EL MOUDJAHID, which was published during the fight for liberation; member of the National Council of the Algerian Revolution. Since independence, Malek Redha served successively as Algerian ambassador to Belgrade, Paris and Moscow before becoming Minister of Information and Culture.

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CSO: 5500

CAPE VERDE

BRIEFS

AUTOMATIC TELECOMMUNICATIONS SYSTEM--Plessey Automatic Electric of Portugal, a company headquartered in Lisbon, has signed a contract with the Republic of Cape Verde to expand the telecommunications system of the archipelago. Worth close to 17 million escudos, and with a 2-year period for delivery and execution, the contract calls for furnishing radiophonic equipment and materials and manpower for installation. Under the terms of an agreement regarding works and investments included in the development plan for the Republic of Cape Verde, the Portuguese Government is responsible for up to 16 million escudos of the cost of this undertaking. [Text] [Bissau NO PINTCHA in Portuguese 16 Mar 78 p 3] 6362

CSO: 5500

GUINEA-BISSAU

BRIEFS

JOINT TELECOMMUNICATIONS COMMISSION--The Joint Commission for Postal and Telecommunications of Guinea-Bissau and Cape Verde held its third meeting last Tuesday in Bissau. In the first discussion session the agenda was outlined, and at the same time three separate committees were created to study the following questions: postal service, use of telecommunications, and telecommunications technicians. At the meeting, which has now been concluded, each of the joint members presented a summary of the experience acquired in the respective country. There was also a report on the development programs in progress and on those which are to be adopted in the future. In Guinea-Bissau's case, the telecommunications projects are those of L.M. Ericsson, and the project in cooperation with France is the responsibility of the France Cable Co. With respect to Cape Verde, mention was made of the emergency project financed by the African Development Bank, the project for the expansion of existing telecommunications systems and a small assistance project by the FIR [expansion unknown] (regarding the control of air space). Later sessions also took up questions regarding the training of technicians and the coordination of operations at the regional and international levels. [Text] [Bissau NO PINTCHA in Portuguese 15 Apr 78 p 2] 6362

NEW TELEPHONE LINK--Within the scope of cooperation with France, the Bissau-Bolama telephone link was inaugurated by Comrade Francisco Mendes, the prime commissioner, who spoke by telephone with Comrade Francisco Pereira, president of the state commission for the region of Bolama-Bijagos. According to information supplied by the officials responsible for this service, the Bissau-Cacheu connection is also in operation. This project is being extended to other regions of the country, namely to Fulacunda, Catio, Bissora and Gabu. A team of telecommunications technicians is presently mounting antennas in these locations, and it is expected that these connections will go into operation by the end of this month. [Text] [Bissau NO PINTCHA in Portuguese 7 Mar 78 p 2] 6362

CSO: 5500

MALI

BRIEFS

FRG LOAN FOR TRANSMITTERS--On Tuesday, 9 May 1978 at 1600 hours, a brief ceremony was held in the Conference Room of the Ministry of Foreign Affairs for the signing of a loan agreement between the government of the Federal Republic of Germany and the government of the Republic of Mali. According to the terms of this agreement, the government of the Federal Republic of Germany, through the intermediary of the "Kreditanstalt Fur Wiederaufbau" (KFW), places at the disposal of the government of Mali a credit of 8,770,000 Deutsches marks (that is nearly 1,929,400,000 Malian francs) for the acquisition of two shortwave transmitters of 50 and 10 kilowatts and one 100 kilowatt medium-wave transmitter. [Excerpt] [Bamako L'ESSOR in French 11 May 78 p 5] 8143

CSO: 5500

USSR

INTEGRATED QUASIELECTRONIC COMMUNICATIONS SYSTEM: TECHNICAL-ECONOMIC ADVANTAGES

Moscow VESTNIK SVYAZI in Russian No 3, Mar 78 pp 27-29

[Article by L. Ya. Misulovin, scientific division chief of the Central Scientific Research Institute of Communications, candidate of technical sciences]

[Text] The integrated quasielectronic communications system developed by the specialists of the USSR and the German Democratic Republic combines the most important features of both the quasielectronic systems of the automatic telephone offices and the integrated digital communications systems. With a defined set of developed equipment it is possible to form a number of standard quasielectronic automatic telephone offices of different capacity. These offices will be produced by Soviet and German Democratic Republic industry on the principles of specialization and cooperation of production. The experimental model of one such station, the Istok, has already been manufactured at the Pskov automatic telephone office plant. In our country these offices will be used in the first phase as rural offices and PBX offices. The use of quasielectronic offices will permit reliable, stable telephone communications and will reduce the number of operating personnel by several times.

The developed integrated quasielectronic communications system contains stations with a capacity from 64 to 1,024 numbers (64/1,024), from 512 to 4,096 numbers (512/4,096) and from 3,584 to 16,384 numbers (3,584/16,384). The stations with the 64/1,024 and 512/4,096 capacity can have their own control unit (autonomous mode) or be controlled remotely from another, superior station (the integral regime). During the course of their operation it is quite easy to convert from one operating mode to the other. The station with 3,584/16,384 capacity operates only with its own control unit.

The control unit is a specialized computer with developed structure operating by the recorded program principle, which permits variation of the output capacity of the control units in accordance with the capacity and the operating regime of the station.

All of the stations can include both physical connecting lines and the multiplexing channels with PCM or with frequency separation. It is possible to connect only the cable connecting lines to the remote control station: physical or multiplexed PCM equipment.

The subscriber lines are physical lines with a loop resistance of 200 ohms with a leakage of no worse than 20 kilohms. All types of stations are designed for inclusion of the subscriber lines with a load range from 0.06 to 0.24 erlangs. If all of the subscriber lines have a load of 0.24 erlangs, then the maximum admissible capacity of the station decreases. The proportion of the paired subscriber lines can reach 100 percent under the condition of observation of the limiting admissible telephone loads. Thus, the capacity of each of the stations can be doubled without significant change in cost.

As a result of the possibility of easy variation of the structural diagram, all of the stations can operate both with closure of the subscriber traffic and without closure (substation modes). The last mode, especially combined with remote control, permits the creation on the city networks of an entire range of economical substations with a broad capacity range (from 64 to 4,096 subscribers).

In each of the stations it is possible to form groups of common interests from the subscribers which inside the group will be able to use abbreviated numbering of the telephones and other advantages of the PBX.

In all types of offices the subscribers will have a broad selection of additional types of equipment and both ordinary and push-button telephones.

The commutation devices of the station are capable of transmitting signals which occupy the frequency spectrum from 0 to 1.5 MHz with amplitude in the low-frequency range of up to 127 volts and 0.2 amps.

The described set of equipment will permit the construction of communication networks which can operate in two modes--integrated and autonomous. Both operating modes can be combined in the same network. In the integral mode of operation in the commutation system both the analog and digital signals can be commuted, and in the autonomous one, only the analog signals.

This set of equipment can be used for the construction of the rural, PBX and city telephone exchanges. The junction with the existing automated telephone offices (step and crossbar) is made only through the offices with autonomous control.

The development of the entire set of equipment has been broken down into several phases. First of all the 64/256 station with remote control and the 512/4,096 station with its own control unit are created.

The expected cost of the station equipment of the integrated quasielectronic communications system is determined by calculation. It is obvious that on organization of the production of these offices, the actual prices can differ from the calculated prices. In Table 1 we have the specific (for one number) cost of the station equipment (without the channel-forming equipment) for the terminal office (OS), the junction office (US) and the central office (TsS). (The DVO are the auxiliary forms of equipment.) In the last row of the table the average cost of one number on the radial junction network of the rural telephone communications with a capacity of 6,000 numbers is given.

Table 1

<u>Capacity and Type of Station</u>	Specific Cost of Station Equipment, rubles			
	Autonomous Mode		Integrated Mode	
	Without DVO	With DVO	Without DVO	With DVO
64 numbers, OS	270	310	170	170
128 numbers, OS	190	220	110	110
1,024 numbers, OS	140	140	72	72
64 numbers, US	470	530	260	260
128 numbers, US	360	410	240	240
3,072 numbers, TsS	130	140	150	150
Network for 6,000 numbers	170	190	135	140

Table 2

<u>Capacity and Type of Station</u>	Average Idletime in Hours Per Year			
	Autonomous Mode		Integrated Mode	
	Without DVO	With DVO	Without DVO	With DVO
64 numbers, OS	18	0.15	9.1	0.050
256 numbers, OS	--	0.15	--	0.050
1,024 numbers, OS	--	--	--	0.080
4,096 numbers making up the network	--	--	--	0.016

As is obvious from Table 1, the integrated regime requires significantly lower specific capital investments than the autonomous regime. These investments in practice do not increase with the introduction of the auxiliary forms of equipment as occurs in the autonomous mode.

The reliability of the equipment of the integrated quasielectronic communications system was investigated from the point of view of the subscribers and from the point of view of the service personnel. The reliability from the point of view of the subscribers is characterized by the average idle-time during the year for the equipment servicing the investigated group of

subscribers. The communication losses for more than 10 percent of the subscribers of the investigated group or an increase in the loss of messages to more than 10 percent or the loss of any form of communications are considered idletime.

Table 3

<u>Capacity and Type of Station</u>	<u>Average Number of Damages Per Year</u>			
	<u>Autonomous Mode</u>		<u>Integrated Mode</u>	
	<u>Without DVO</u>	<u>With DVO</u>	<u>Without DVO</u>	<u>With DVO</u>
64 numbers, OS	7	10	5	6
256 numbers, OS	--	11	--	7
1,024 numbers, OS	--	--	--	35
4,096 numbers making up the network	--	--	230	280

As is obvious from Table 2, the average idletime in hours per year in the integrated mode is less than in the autonomous mode in spite of the fact that the control is centralized within the limits of the network. This occurs as a result of the fact that in the integrated mode there is appreciably less equipment than in the autonomous mode which is obvious also from the table, for the cost and the amount of the equipment are closely related.

The reliability from the point of view of the service personnel is determined by the average number of damages to the equipment in the year considering the service regime. Whereas for the subscriber failure of part of the reserve equipment goes unnoticed, from the point of view of the service personnel all failures must be considered.

As the calculations show, the average number of damages in a year in the integrated regime is less than in the autonomous regime (see Table 3). A quite low total number of damages is the result of the application of highly reliable elements (hercons, integral circuits, plugs with gilded contacts, and so on) and a decrease in the total amount of equipment which is characteristic of the integrated regime.

As is obvious, the integrated regime has a noticeable advantage over the autonomous regime with respect to cost and reliability. In addition, it is possible to add the advantage in the occupied space and the possibility of automating the process of operational servicing within the limits of the section or even an entire network, for example, a rural district. In addition, as a result of centralization of control in the integrated regime the carrying capacity of the network increases by 15-30 percent, and the possibility of combining several forms of communication in it, telephone, telegraph and data transmission, appears.

However, it is possible to realize the integrated regime only in the case where several stations of the integrated quasielectronic system are

installed directly on the network or during a relatively short time interval which form a radial or radial junction network with a central station equipped with a united control device for the entire network. In addition, the connecting lines in this network must be cable lines.

These conditions can be developed far from everywhere. Very frequently the necessity arises for installation of only one station (for example, the PBX) or on the network the overhead connecting lines continue to be used (for example, in rural areas) or the multiplexing equipment operates on cable with frequency separation which is incompatible with the PCM-type equipment. In these cases offices can be used with autonomous control.

In addition, on the network where the stations are used with autonomous control, several closely arranged offices of the integrated quasielectronic system can appear, the overhead connecting lines are replaced by cable lines, and so on. Then, from the defined point in time the offices with autonomous control are expediently converted to the integrated mode. The situation where the office operating in the integrated mode with remote control is expediently converted to the autonomous mode after several years of operation should not be overlooked. This can occur with a significant increase in capacity of the office.

Table 4

<u>Capacity</u>	Specific Volume of Equipment in Liters Per Number		
	<u>Crossbar Automatic Telephone Office</u>	Integrated Quasielectronic	
		<u>Autonomous Mode</u>	<u>Integrated Mode</u>
64	(ATSK 50/200) 16	13	13
256	(ATSK 100/2,000) 29	10	5
1,024	(ATSK 100/1,000) 22	9	4
4,096	(ATSK 10,000) 26	8	8

Table 5

<u>Capacity</u>	Specific Area in m^2 Per Number		
	<u>Crossbar Automatic Telephone Office</u>	Integrated Quasielectronic	
		<u>Autonomous Mode</u>	<u>Integrated Mode</u>
64	(ATSK 50/200) 0.140	0.100	0.100
256	(ATSK 100/2,000) 0.080	0.054	0.030
1,024	(ATSK 100/2,000) 0.054	0.023	0.012
4,096	(ATSK 10,000) 0.055	0.016	0.016

Consequently, the optimal communications system must include the offices with integrated operating regime and with autonomous operating regime and something of great importance, the offices must permit two-way transition from one operating regime to another. The developed integrated communications system has just such properties.

By comparison with the crossbar equipment, the offices of the integrated quasielectronic system have smaller volume (see Table 4) and nomenclature of equipment (a total of 17 types of racks instead of 47 in the ATSK); they occupy less area (see Table 5). In addition, in these stations the carrying capacity has been increased, and the quality of the talk channel has been improved. The passband of the commutation system has been expanded to 1.5 MHz, and the possibility for transmission of digital data with high reliability is ensured. Other advantages of the offices of the integrated quasielectronic system are the provision of the subscribers with a large set of additional forms of equipment, improvement of reliability, automation of the technical operating process, standardization of equipment for the networks for different purposes and different capacity ranges.

The introduction of this communication system can be carried out without re-equipping the existing networks and with small initial capital expenditures.

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USSR

SEVEN-DIGIT TELEPHONE NUMBERS: EFFECT OF ORGANIZATION OF CONVERSION

Moscow VESTNIK SVYAZI in Russian No 2, Feb 78 pp 23-24

[Article by V. V. Malinikov, head of the Leningrad City Telephone Exchange, and G. G. Sokolova, deputy chief engineer]

[Text] A 7-digit telephone numbering system has been introduced in Leningrad (in 1976). All of the automatic telephone offices were switched over to the new operating mode simultaneously without interruption of communications. The telephone network has operated stably since the switchover. This article tells about some of the technical and organizational solutions which can be useful in analogous action taken in the other telephone networks of the country.

At the time of conversion to the 7-digit numbering, the Leningrad City Telephone Exchange was a multioffice exchange with incoming communications junctions through which connections were made between the automatic telephone offices of the various junction areas. Inside the junction areas the automated telephone offices are connected by the "each-to-each" principle. The IGI null decade is used for special services, and the eighth, the long-distance office.

The switching of the network to 7-digit numbering took place in the following way. All of the automatic telephone offices in operation at the switching time were converted to the second million zone without organization of the incoming message junctions: the DGI-2 were installed at all of the 10-step automatic telephone offices, and the register and marker operating program was changed at the crossbar-type telephone exchange. This made it possible to keep the interoffice communications bunches the same. The load from eight equipped decades of the IGI field was switched to a second decade. (Before switching this decade was also equipped, but for a comparatively short period of time and with small load; therefore the technical condition of the field contacts could be considered satisfactory.) Later when the automatic telephone office is grouped into the million zones corresponding to the territorial arrangement, the load on the second decade will be reduced.

For convenience of the subscribers, it was decided to switch all of the operating automatic telephone offices to the second million zone simultaneously. For this purpose it was necessary to ready all of the facilities for the planned time and ensure extreme precision in the organization of the work and mass information of the population of the forthcoming switch-over.

The plan for organizing the switchover developed by the Leningrad City Telephone Exchange jointly with the Giprosvyaz'-2 Institute provided three periods: preparatory, prestart and poststart. During the preparatory period at the 10-step automatic telephone offices, an additional dialing step was installed, the field of the second IGI decade was cut, and temporary jumpers were installed to maintain the existing cross connections of the active second decade and also the DGI field was connected (paralleling) to the active connector relays of the interoffice communications. In this case the cross connections on the IDF were not soldered to the DGI which offered the possibility of checking out the DGI equipment during the entire preparatory period by using the APA or other instruments.



Figure 1. Electrician of the central telephone exchange L. A. Ustyugova testing equipment.

For a month before the switchover at the 10-step automatic telephone office the cross connections were soldered on the DGI input side on the IDF, and the inputs of the devices are isolated as follows in order not to interfere with the active second decade: in the DGI of the ATS-54 automatic telephone office the relay B is fixed in the operating position using specially built locators, and individual fuses are removed; on the DGI-47 the devices are taken out of the initial position and the individual fuses are removed. During the installation work the cable remaining after switchover was permanently laid, and that intended for dismantling was soldered at the top and visually extinguished which excluded errors at the switchover time, which was thus reduced to cutting off the lines.

In the crossbar exchanges during the preparatory period, the removable blocks for the markers were mounted and checked out on the operating equipment, and jumpers were built on the registers for the operation of the SM relay, under the armature of which a cable was laid before switchover.

The prestartup period began several hours before switchover when the load dropped off. The volume of operations was precisely calculated for each automated telephone office. During this period approximately 30 percent of the line from the still operating second decade of the IGI was disconnected and it was prepared for connection to the DGI of the second million zone (the installation operations--cutoff of the wires, putting the two-motion selector and devices into operation and checking out the exits). At the crossbar exchanges 30 percent of the IGI units were disconnected and the registers corresponding to them were replaced by blocks, the SM relays were readied for operation, and the installation work was done on the AKS.

At 0000 hours on 21 August one-third of the lines on all of the 10-step automatic telephone offices readied during the prestartup period, one-third of the IGI equipment at the crossbar exchanges were put into operation simultaneously. The remaining lines and units were blocked. The 7-digit numbering was in operation in the city from that time on. At the 10-step automatic telephone offices where the fields of all the decades except the second, IGI and DGI remained paralleled for several hours it was possible also to use the 6-digit dialing. Then after performing operations analogous to the prestart period, the blocked lines of the 10-step automatic telephone offices and the IGI blocks of the crossbar exchanges were put into operation. This ended the conversion of the crossbar exchanges to the 7-digit numbering, the automatic information units were connected immediately after inclusion of the GI units and registers. At the 10-step automatic telephone offices there was still work to be done with respect to deparalleling the IGI and the DGI outputs which was done individually by decades with connection of the previously prepared automatic information units to the freed decades of the IGI. From that time the 6-digit dialing was eliminated, and the subscriber received information about the switchover. According to the schedules calculated individually for each automatic telephone office, the startup period on the crossbar exchanges ended by 0300 hours, and on the 10-step automatic telephone offices, by 0600 hours. In practice, by 0400 hours all of the switchover work had been done. On the night of the switchover 500 people participated in the work--workers from the Leningrad City Telephone Exchange, the Lentelefonstroy, including the reserve brigades of riggers, drivers for the duty transportation units, and duty officers for the switchover.

The poststartup period which consisted in dismantling the cross connections on the IDF was not provided for on the switchover schedule.

Of course, such efficient organization of the switchover was provided for by the large amount of preparatory work. One and a half years before switchover, a special group was created at the Leningrad City Telephone

Exchange which solved all of the technical problems, developed the plan for performance of the operations, simultaneously realizing the technical inspection of their performance at the automatic telephone offices. Three months before switchover a special commission went to work with the participation of representatives from the Main Administration of Telephone Communications of the USSR Ministry of Communications which again inspected the technical solutions and gave special attention to the organizational problems. A week before switchover, a training exercise was held with connection of the network of automatic information units.

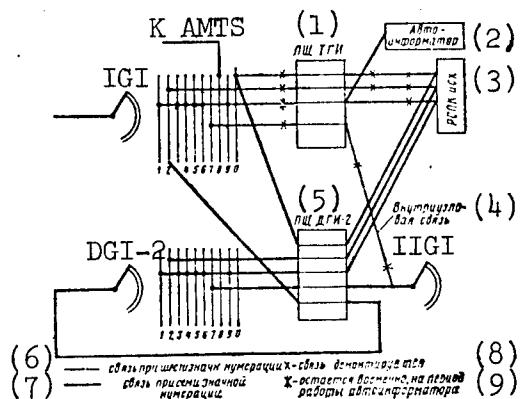


Figure 2. Structural diagram of the switchover of a 10-step automatic telephone office from 6-digit to 7-digit numbers.

Key:

1. IDF IGI
2. Automatic information unit
3. Initial RSPK
4. Main inner connection
5. IDF DGI-2
6. Connection to 6-digit numbers
7. Connection to 7-digit numbers
8. Connection dismantling
9. Remaining temporarily, in first operating automatic information unit

The preparation of the subscribers for the forthcoming changes in telephone numbers was accomplished ahead of time: 1.5 million information lists were sent out to the population and left in the coin telephone booths, advertisement lists for the organizations, news bulletins in the newspapers, on radio and television and at the subway stations, a special movie film which was shown at all of the movies in the city and also advertising in the suburbs--all of this promoted normal operation of the telephone network after switchover.

The automatic information units answering the subscribers in case of incorrectly dialed telephone numbers played a decisive role. Automatic information was supplied from eight central automatic information units over the

service information network at the outputs of the freed decades of the automatic telephone offices through the repeaters and decoupling circuits. The repeater and bypass racks were specially developed and manufactured at the Leningrad City Telephone Exchange, and each one made it possible to connect information simultaneously to 150 outputs. One or two of the racks were installed at every automatic telephone office. The automatic information was provided round the clock for 1.5 months after switchover, then another month in the daytime.



Figure 3. Senior engineer of the Ul'yanovskaya automatic telephone office G. A. Turkova controls the operation of the automatic telephone office after switchover.

The greatest danger to a normal operation of the telephone network after switchover came from erroneous dialing, that is, dialing of the 6-digit numbers which could create an additional load. Therefore, the switching was carried out during the lowest load period, at the end of the 3d week of August. However, measurements of the load occurring on 25 percent of the IGI groups of the 10-step automatic telephone offices demonstrated that no significant change occurred after switchover. By calculations the erroneous dialing during the first days after switchover created an additional load on the IGI within the limits of 1-1.5 percent.

The number of erroneous dialings which during the first day after switchover reached 40 percent at the individual automatic telephone offices dropped by two or three times the next day and decreased continuously for the 1st week of observation. The number of errors from the PBX subscribers at all of the observed automatic telephone offices was lower than from the residential subscribers.

There were no failures in the second decade of the IGI of the 10-step automatic telephone office. At only 17 percent of the automatic telephone offices was an increase in the current consumption noted, but its values were 30-40 percent below the values observed before holidays. The measurements

of the failures at the automatic information units demonstrated that the selected number of outputs was sufficient for the erroneous dialings. When calculating the number of leads to the automatic information unit from the freed decades, the time spent giving out automatic information has great significance. The information text must be short and laconical as possible. The observations demonstrated that after switchover on the average the subscriber listened to the information twice, and in the subsequent period there was a sharp decrease in the time spent listening to the information, especially during the daytime.

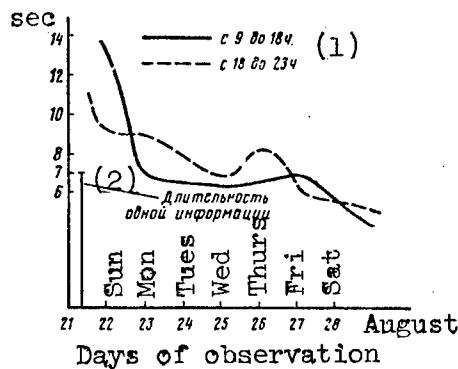


Figure 4. Average time the subscribers keep the automatic information units busy.

Key: 1. From ... to ... hours
 2. Time for one session of providing information

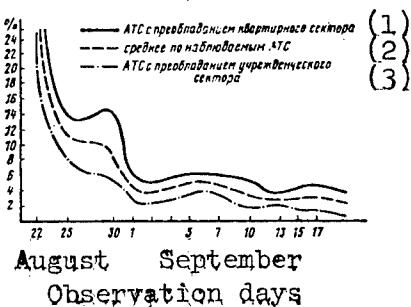


Figure 5. Dynamic reduction of the number of erroneous dialings after switchover of the automatic telephone office to the 7-digit numbering.

Key: 1. Automatic telephone office with conversion of a block section
 2. Average with respect to the observed automatic telephone offices
 3. Automatic telephone office with conversion of the PBX section

The conversion of the Leningrad City Telephone Exchange to the 7-digit numbers is only the beginning of the further development of the network. It

is necessary to construct a network of million zones, that is, to organize a significant number of incoming message junctions for the new million zones, and connect them by high-frequency or low-frequency cables with incoming message junctions for the newly constructed automatic telephone offices. In 1977 the collectives of communications specialists of the Len-telefonstroy Trust and the Leningrad City Telephone Office constructed and included 17 incoming message junctions simultaneously, at the same time opening up the possibility for communications with the new automatic telephone offices.

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USSR

A MATTER OF GREAT IMPORTANCE: POSTAL AREA NUMBERS

Moscow VESTNIK SVYAZI in Russian No 2, Feb 78 pp 25-26

[Article by S. M. Plotnikova, Vladivostok]

[Text] It is a complicated matter to have all of the letters mailed in the country be addressed by an index of six stylized digits. Nevertheless, the postal workers of the country are working on this matter. It is hardly necessary to mention the importance of introducing the indexing of mail correspondence which the postal branch has been working on for many years. Nevertheless, I should like to note the following: now in places it is necessary to set about this work especially intensely and with a greater sense of responsibility. It is known that the MAP-0 automatic machine developed by the SPKB special design office of the USSR Ministry of Communications has been in experimental operation since 1976 at the largest railroad post office in the country at Kazanskiy railroad station in Moscow. By 1980 similar machines are to be installed at several of the junction post offices. The reader of the MAP-0 is designed for correctly written (in stylized digits) six-digit indices. If there is no index, the letter goes for manual handling. It is understandable that the effect of the application of the new, expensive equipment, the purpose of which is to increase the efficiency of handling of correspondence and accelerate its movement from the sender to the addressee, depends on the communications workers locally, beginning with the PTUS workers and ending with the postman.

In the Primorskiy Kray, more than half of the rayon and municipal communications junctions have achieved 90-percent use of the indexing of the outgoing correspondence, and the average figure for the kray is 88.9 percent. This is good if we consider that the percentage of outgoing letters indexed throughout the communications administrations of the country is on the average 79.8 percent.

There have been no special extraordinary measures taken by the communications workers of Primor'ye with respect to the introduction of indexing, but I do feel that there is something the other collectives can use.

The main thing is to do the work constantly, on a daily basis. This is how the postal workers of the kray have approached the problem during the past years, and the rule will not be changed. In its time, a commission was created under the kray PTUS administration for the introduction of indexing. This commission included the workers from the dispatch junction of the GUPS, the postal communications service and the directors of the large postal enterprises. It was headed by the deputy chief of the administration. Analogous commissions are working also in their rayon and municipal communications junctions. Although they have already existed for 7 years, the work has not diminished, only the methods have changed. The fact is that taking defined measures one time is entirely insufficient. This is why the indexing sheets are delivered to the population periodically just as they were several years. The management workers of the PTUS and the enterprises systematically write articles in the kray, municipal and rayon newspapers, they talk on television and radio explaining why the indices are needed. In 1976 alone, two television programs were organized: the workers of the PTUS and the Vladivostok railroad post office held a discussion with the television viewers.

All the communications enterprises are supplied with postal indexing reference books obtained in centralized order and also manufactured locally with indication of the indices of the communications enterprises of Primor'ye. All the work areas for servicing clients are equipped with them. On taking the mail the operators check to see whether there is an index, they see that the people supply it and help them use the reference books. At some enterprises special reference tables have been organized for the clients.

The communications specialists have seen that all of the institutions, organizations and enterprises of the national economy of the kray have been supplied with these references (12,000 copies were sold through the Soyuz-pechat and communications enterprise kiosks). It must be stated that the work has been purposeful and planned. In particular, there have been discussions of the necessity for indexing, not from case to case, but by charts. In accordance with the decisions made by the ispolkoms of the municipal and rayon councils, the institutions, enterprises and organizations have replaced the old address stamps and accompany envelopes with new ones, with the six-digit index codes. By agreements between the PTUS and the editors of local newspapers none of them will accept advertisements for publication if the index is not given in the address.

During recent years the communications specialists have constantly checked to see that the enterprises and institutions send out correspondence with indices. If violators are discovered, they are sent letters with the request to use the established addressing procedure with reference to the corresponding ispolkom resolutions. If this does not work, the institution is sent a similar letter signed by the chairman of the ispolkom. In 1976 the group working with the customers of the Vladivostok post office alone sent out more than 700 such letters to the enterprises and organizations.

In practice the procedure goes as follows: on discovering unindexed service correspondence in the post boxes, the guilty parties are invited by telephone to complete the addresses.

At one time there were envelopes and postcards for sale without guidelines which interfered with indoctrinating the population in proper addressing habits. Accordingly, a special stamp was produced which was put in the stamp machine. By using this stamp the communications enterprises applied the guidelines to all of the old-style envelopes and postcards.

More than 25,000 metal tablets with indication of the index have been manufactured centrally for each city and village in the kray. Indices were stenciled on all of the group subscriber boxes, base stations and mailboxes.

All of the communications enterprises were supplied with stamps made in the engraving office so that an impression of the index was applied to letters coming from other enterprises without an index in the recipient's address.

It is quite obvious that the success of the matter is impossible without constant control on the part of the PTUS. This is why the kray commission on indexing reviews the course of its introduction quarterly. The communication enterprise directors periodically talk at the meetings of the PTUS council and the commission, and the resolutions adopted are reported to all the remaining enterprises. Review of letters with an analysis of the introduction of indexing are sent out throughout the kray quarterly. During complex checking of the operating activity, a deep analysis is made of the indexing work, and its results are reflected in the documents, in a special section.

Beginning in 1974 a competition inspection has been made in the collectives of all of the enterprises annually for the best communications division (section) with respect to the introduction of indexing. The percentage introduction is considered when summing up the results of the socialist competition of the junctions and considering the sizes of the bonuses to the directors, and their assistants with respect to the summaries of operations for the quarter.

Such junction as Bol'shekamenskiy, Novopokrovskiy, Pogranichnyy, Khorol'skiy are now ahead. The proportion of outgoing letters with correctly affixed indices is now 95 percent.

The communications divisions of Roshchino of Novopokrovskiy Rayon and Smolyaninovo of Bol'shekamenskiy Rayon have reached 98 percent. They belong to the third group and service the large workers' villages. The entire collective of the divisions has been mobilized to work on indexing. For example, the mailmen make apartment-by-apartment rounds to all of the clients who receive letters without indices in the addresses. The directors and other workers of these communications divisions frequently appear at meetings of the residents, at meetings of the rural and village councils

of workers' deputies where, along with other problems, attention is constantly focused on the course of the introduction of indexing, and deficiencies are noted with presentation of specific examples.

The introduction of the six-digit indexing will make it possible to use the inexperienced, low-qualified workers and also students at the institutions of learning to sort mail during the preholiday periods, for they can sort the letters by indices.

At the present time the kray communications specialists are experiencing difficulties in the explanatory work on indexing at the large enterprises and in the organizations where more than 200 or 300 letters a day are sent out. The fact is that the affixing of the indices manually, especially in stylized numbers, requires great expenditures of time and labor on the part of the workers. In our opinion, centralized production of special machines for the application of the six-digit numbers to envelopes and postcards and equipment of the large enterprises and organizations with them are extremely necessary.

The workers of the postal branch of the Primorskiy Kray will do everything required in the future so that all of the letter correspondence will go by indices. In this they see the possibility of significant improvement of the productivity of labor in the handling of correspondence and acceleration of its delivery.

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USSR

AUTOMATION--MAIN AREA OF DEVELOPMENT OF TELEGRAPH COMMUNICATIONS

Moscow VESTNIK SVYAZI in Russian No 2, Feb 78 pp 27-29

[Article by V. I. Korol', KONIIS institute chief, candidate of technical sciences]

[Text] Under the modern conditions of the scientific and technical revolution, the role of telegraph communications has increased significantly. Today the telegraph operations are realized by more than 86,000 communications stations providing for the transmission of about 500 million telegrams per year. Many of the industrial enterprises, institutions and organizations connected to the subscriber network of the country themselves establish direct document communications by teletype. The phototelegraphic services also enjoy high demand. The automated technological process control systems and the branch automated control systems that have been introduced into production use data transmission equipment.

The further development of these document communications means requires the introduction of new highly efficient equipment. A collective of the Kiev Division of the Central Scientific Research Institute of Communications (KONIIS), which is the scientific and technical center of the telegraph communications branch, is working on the solution of this problem.

The primary area of scientific research work is automation of the production processes on the telegraph network which offers the possibility of timely transmission of ever increasing flows of information without perceptible expansion of the operating and maintenance staff and production area. As a result of the development and introduction of the automated direct communications systems, the number of steps in the processing of the telegrams on transmission of them from the sender to the addressee has been decreased significantly. As a result of the application of the automated direct coupling stations which significantly reduce the labor-consuming processes of transceiving of telegrams, it has become possible to reduce the transit exchange by 1.2 million telegrams per day and cut the average transmission time for one telegram in half. On completion of the conversion of the entire telegraph network to the direct coupling system its efficiency will become still higher.

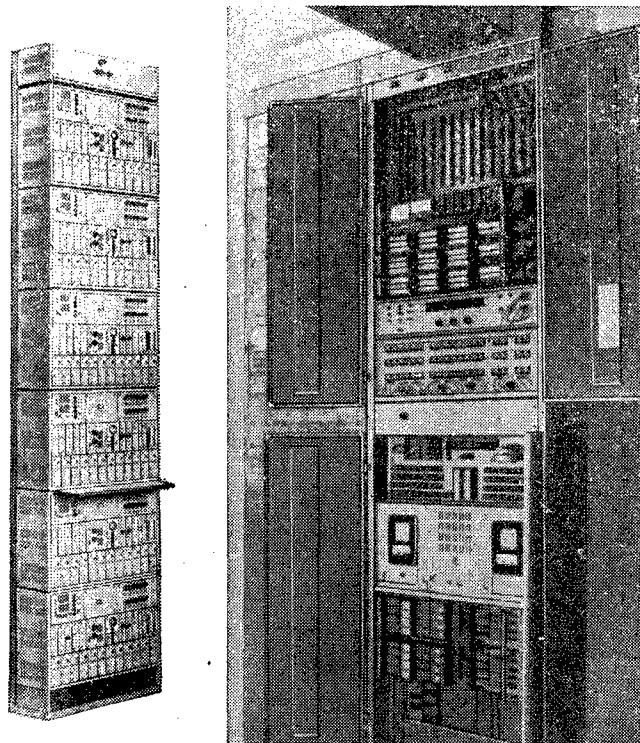


Figure 1. Equipment for voice-frequency TT-12 telegraphy based on integrated microcircuits with quartz stabilization of the basic parameters (on the left); general station combination rack for the PTS-K substation (on the right).

The message commutation centers developed on the basis of computers (TsKS) play a significant role in decreasing the massive manual labor in the handling of the transit main flows of telegrams. The planned introduction of the first stage of the TsKS (in Moscow, Khabarovsk, Novosibirsk) will accelerate the delivery of the telegrams and it will improve the degree of automation of their handling on the main links.

The work aimed at maximum combination of technical means of the subscriber network, the direct coupling system and the data transmission equipment into an integrated telegraph-type network and the creation of the automated network control system, the introduction of which will permit improved quality and reliability of the telegraph network to be achieved by dynamic control of the load distribution, have great significance for improving the efficiency of the telegraph communications means. These projects of the KONIIS Institute have found reflection in the "basic areas of development of the networks of commutable telegraph communications of the direct coupling systems and subscriber network," "Telegraph Rules," and the "Recommendations for the Application of Message Commutation Centers on the General Purpose Network" now being prepared and also a number of state standards

and other documents which are used when designing and operating the telegraph network and which regulate the characteristics of its elements and the equipment used.

One of the principal elements of the general purpose telegraph network and subscriber telegraph is the commutation station. Now basically the automated switching stations of the AT-PS-PD type are in operation in the republic and oblast centers; in the large rayon centers, the substations of the PTS-K type; in the intraoblast stations with small (up to 20) numbers of subscribers, the ATA-MK and the ATK-20 type substations. The modified stations of the Nikola Tesla Plant (Yugoslavia) are also finding broad application. In the creation of them, the most improved element base, the multiple coordinate connectors, relays and elements of modular electronics were used. An important distinguishing feature of these stations is the absence in the transition networks of information signals of the radio relays and the converting electromechanical relays which have made it possible to eliminate the additional distortions of the transmitted signals, to increase the transmission rate on the network from 50 to 200 baud and significantly simplify the equipment.

All of these commutation stations and substations of the coordinate-type can be included in a single telegraph network. Its qualitative indices are improved here as a result of shifts of the load peaks in the various networks and enlargement of the bunches of channels, the volume of the required equipment will be decreased, and as a result of creation of united services, the service personnel staff will be reduced.

In the near future new electronic commutation stations will appear on the telegraph network which will provide for the introduction of up to 100 different categories of subscribers, they will increase the limiting transmission rate to 2,400 baud, and they will provide all subscribers with new services: abbreviated dialing of numbers, establishment of connections with respect to three categories of urgency, multiple address and circular communications, and push-button dialing. The KONIIS Institute is developing this type of electronic commutation station. Line testing of it is planned for the end of the 10th Five-Year Plan, and industrial production, by the 11th Five-Year Plan.

The telegraph network indices such as the percentage failures when establishing a connection, the reliability of transmission and reliability of communications depend to a significant degree on the number and quality of the available telegraph channels. Significant shortage of them and the increased load planned in the near future are making the problem of creating new channel-forming equipment an urgent one. This would provide a large number of channels and have high reliability, small overall dimensions, low weight and low energy intake.

Until recently when developing the telegraph channel-forming equipment, the frequency method of channel sharing was used exclusively. As a result, a

large fleet of voice-frequency telegraph equipment was created. The modern Soviet transit voice-frequency telegraph equipment of the TT-12 and TT-48 type is on the level of the best world models: it has small size, it is relatively light (the specific weight for the channel will be 3.5-6.0 kg), it is economical with respect to electric power (it consumes 8-10 volt-amperes on a channel), it is resistant to climatic effects (the operating temperature range goes from +5 to +40° C).

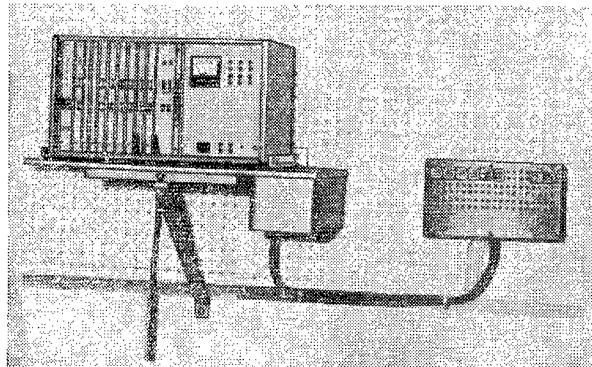


Figure 2. Duplex subscriber telegraph DATA-6PO installed in the municipal communications division of Leningrad.

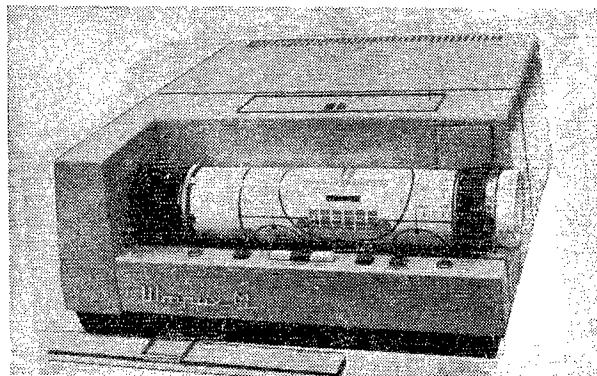


Figure 3. Facsimile transceiving equipment Shtrikh-M.

With the development of the data processing equipment using digital elements it has become possible to begin the development of equipment with time sharing of the channels, the so-called multiplexors which, without being inferior to voice-frequency telegraph with respect to the above-enumerated operating and technical indices, are significantly superior to it with respect to degree of use of the carrying capacity of the communications channel and with respect to the technical-economic indices. The multiplexors of the TVU-12, TVU-12M, DATA types created in the KONIIS Institute and the URAL and AGAT equipment joined with them have resolved the problem of organizing communications on the local networks. In the near future, it is

necessary to expect the appearance of the multiplexors designed for the organization of main communications lines and permitting the formation of more than 100 telegraph channels in one voice-frequency channel.

A necessary condition of the complete realization of the potentials of the automated telegraph networks and, in particular, the direct coupling system is equipment of the network with modern terminals. Unfortunately, the Ministry of the Communications Equipment of the USSR still has not mastered the production of roll-type teletypes which must replace the low-output tape telegraphs type STA-M67 on the network.

The facsimile terminal equipment developed at the KONIIS Institute has found broad application on the telegraph network of our country.

The Shtrikh facsimile equipment which has been introduced into production transmits and receives text and graphical messages over the physical networks of the city telephone exchange at a rate of 120 and 240 lines per minute and also over the voice-frequency channels at a speed of 120 lines per minute. The black, red, green and violet line documents and telegrams with glued strips can be transmitted over this equipment, and a black-and-white reproduction will be received. The transmission time for one telegram is 2.5 minutes. The technical parameters of the equipment correspond to the recommendations of the International Telegraph and Telephone Consultative Committee.

The analysis of the existing state of operations with respect to the creation of new facsimile equipment will permit the expectation that by 1980 the industrial production will be mastered and introduction of the facsimile equipment on the network with open recording by the unmanned procedure at a rate of 360 lines per minute and with an average power of the facsimile signals of about 50-60 microwatts will begin. At that time the facsimile equipment will be widely used on local telegraph communications on the scale of the entire country.

The first collective use of stations in our country for data transmission (PKP-PD) has been organized, which, jointly with the 200 baud telegraph channels and automatic switching stations will form a low-speed PD [data transmission] network. The principles will be set down at the same time for the creation of a national data transmission system (OGSPD).

With the appearance on the telegraph network of new terminal commutation and channel-forming equipment, the demand for precision, reliable measuring devices that are convenient in operation will increase. Now this demand is being satisfied by such devices as the edge distortion meters of the IKI-S and the IKI-ST types, the electronic sensor for the EDIT test text, the device for estimating the validity of the PVO transmission, the SChPU-2 pulse interference and interrupt recorder, and so on. In the near future the fleet of measuring and control testing equipment will be filled out significantly.

In order to improve the operating quality of the telegraph network it is necessary to improve its operating system. This can be achieved as a result of the introduction of the correction and control method of operation of the commutation stations, the preventive servicing of the terminal and channel-forming equipment with broad utilization of the automatic monitoring equipment, organizational centralization of the technical servicing by the creation of test control sections on the telegraph with prospective conversion of them in the monitoring and test shop. The institute collective is now working on all of these problems.

The development of the telegraph equipment indicates the worthy contribution of the communications scientists to the matter of intensifying social production. At the same time the course of the CPSU toward improving the operating quality and efficiency in all branches of the national economy is imposing new, higher requirements on Soviet science. Implementing the instructions of the party, our scientists and designers are struggling to improve the quality of scientific research and experimental design work and accelerate scientific and technical progress in the field of telegraph communications.

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FRANCE

ROLE OF PTT INSPECTOR GENERAL'S OFFICE DETAILED

Paris REVUE DES PTT DE FRANCE in French No 1, 1978 pp 3-10

[Article by Georges Clavaud, General Engineer, Chief of the Inspectorate General of Posts and Telecommunications]

[Text] Many government employees are undoubtedly aware of the existence of the Office of the Inspector General. In fact, applicants for promotion to higher grades and for temporary assignment to positions of greater responsibility met recently with the inspector general or the general engineer of their regional circumscriptions. The members of higher management staffs also come to know the officials of the Inspectorate General at the time of a general audit of any national, provincial or regional head office.

The public image of the Inspectorate General is vaguely that of a body that reprimands and punishes.

Actually, the Inspectorate General of Posts and Telecommunications can be defined simply as the upper echelon auditors of our Service.

The most recent legislative act concerning the Inspectorate General of PTT dates back to a decree of 20 July 1971. But before detailing its present role, it may be useful to recall that several inspectorates general exist, each under its respective ministry, and to retrace the ups and downs of a corps that is little known to the general public.

We can then view in perspective the evolution and future of the Inspectorate General of Posts and Telecommunications.

Inception and Role of Inspectorates General

Our present day concept of inspectorates general seems to date from the creation in 1781 of a corps of general inspectors of civil hospitals and correctional prisons. This gave subsequent origin to an Inspectorate General of Government Services under the Ministry of Interior. It must be acknowledged, however, that despite its several efforts to establish its authority and

exercise effective control, the ancient regime's excesses and abuses succeeded in scarring French public opinion for centuries. Hence the precept that those who exercise governing power and handle public funds must be supervised and controlled. Hence also the concern of the various regimes that followed after the revolution of 1789 that the sovereign citizenry be assured of the judicious use of public funds and of the sound and economical management of government services¹.

We will not retrace in this article the histories of the various inspectorates general. Suffice it to note that they were instituted as and when the need arose². The Inspectorate General of Public Education, for example, dates back to 1852, while that of Agriculture has existed only since December 1959. It is important on the other hand to point out the differences among inspectorates. Mr Victor Silvera, civil administrator, differentiates inspectorates general as follows:

- "a) Inspectorates of unlimited scope that exercise auditing authority over all government services; for example, the Inspectorate General of Finance under the Ministry of Economy and Finance;
- b) Inspectorates having unlimited authority in specified matters over all government services having to do with those matters. For example, the Inter-ministerial Corps of Inspectors General for Social Security has, from its origin to its incorporation in the Inspectorate General of Social Affairs, exercised supervisory authority over the social security organizations of all ministries;
- c) Inspectorates whose authority is essentially limited to the activities of a single ministry but can be extended to those of other ministries. The Inspectorate General of Civil Service, for example, is assigned to the Ministry of Interior but its authority can be extended to the personnel, departments, establishments or institutions of ministries other than Interior; and
- d) Inspectorates whose authority is confined to the activities of a single ministry. The majority are of this type. (National Education, Agriculture, Industry, Highways and Bridges, Construction, Cultural Affairs, Posts and Telecommunications, Public Health and Population, Labor, War Veterans, Judicial Services, Civil Aviation, Merchant Marine)^{3, 4}."

Thus, the authority of the Inspectorate General of Posts and Telecommunications is strictly limited to the functions of the Ministry of PTT.

Evolution of the Inspectorate General of PTT

Upon creation of the Ministry of Posts and Telegraphs in 1878 a Control Service was instituted which exercised supervisory control authority in the name of the minister over all postal and telegraph services. It consisted of a director and three inspectors. In May 1879, the minister informed his department heads and branch chiefs that the Inspectorate General of Finance would

continue to audit all postmaster funds and accounts, but that the control inspectors under his direct authority would have auditing responsibility in the purely administrative and technical domains. These inspectors would be responsible for the "permanent auditing of all operational activities and functions."

On 20 March 1886, the consolidation of the technical and operating departments necessitated the designation of a mixed liaison group known as the "working party." Actually, the six principal inspectors comprising it were incorporated into the Inspectorate General of Control but saw their role limited to certain segments of the telegraphic service.

From 1879 to 1914

In 1890, the minister of Commerce, Industry and the Colonies and tutelary minister of PTT, Jules Roche, proposed to the president of the Republic the "replacement of the present control group with a control organization of a higher order to be staffed by four officials of greater rank and acknowledged competence who would be given the title of inspectors general. Each of them would be responsible for continual audit and supervisory control of a regional circumscription the boundaries of which would be set by ministerial decision. They would be empowered, if not to issue orders to the chiefs of service, to bring to the official attention of the central administration any recommendations for improvements that their awareness of the service and of public needs might suggest.

"Each inspector would be assisted by a deputy.

"Because of the exceptional importance accorded the Paris region, there would be two deputies for that circumscription.

"Thus constituted and strengthened, the Inspectorate General will have the prestige and authority it needs to fulfill its lofty mission in the best interests of the service."

A decree of 5 July 1890 signed Carnot, who was then president of the Republic, marks the birth of the Inspectorate General of PTT. Its designated role was to:

--Examine and coordinate plans for the installation and maintenance of inter-provincial telephone and telegraph lines, telephone networks and central telegraph offices

--Watch over the execution of work projects

--Scrutinize telephone and telegraph communications services

--Watch over provincial head offices and all provincial fixed, itinerant and maritime postal operations and services

--Act on all matters referred to it by the central administration and report back its findings and recommendations for corrective action, organizational changes, etc.

The four regional circumscriptions thus created were delimited in accordance with the railway network configuration of that period:

--Paris and the region covered by the western railway system

--the region covered by the northern and eastern railway systems

--the region covered by the PIM and Corsican railway systems

--the region covered by the federal railways, those of Orleans and of the southern sector.

Four inspectors general and five deputy inspectors were appointed. Many of them came from the original Control Service.

Although they did not issue orders to the provincial service chiefs, the latter were asked to consider inspectors general as "representatives of the director general" and to assist them in their task of supervision and control.

On 10 November 1890, the regional circumscriptions were abolished as were the positions of deputy inspector. However, the number of inspectors general was increased from four to six, and the decree specified that they were at the disposal of the minister.

In 1907, a decree relative to the corps of engineers created two posts for them in the Inspectorate General. However, these engineers were designated inspectors general. This was the case of Edouard Estaunie, assigned to the Inspectorate General on 1 June 1911.

Nine years later, on 2 September 1916, at the height of the war, Minister Clementhal submitted to President Poincare a decree that reestablished the regional circumscriptions while retaining the mobility of the inspectors general according to the needs of the moment. The inspectors general were also given the function of presiding over second echelon staff ratings commissions permanently, and over other commissions and administrative committees on an ad hoc basis.

The decree stipulated that at the end of each quarter the inspectors general would meet in committee to exchange views and coordinate their work. These committee meetings would be chaired by an inspector general to be designated by the minister. But not until 1921 would a decree provide that a chief of service, to be designated by the minister, would thenceforth direct all the activities of the Inspectorate General. Each quarterly committee of inspectors general must address a report to the minister.

These relatively frequent changes in the role and organization of the Inspectorate General paralleled the development of PTT in the technical and financial⁵ domains, as well as the increase of its personnel from 70,000 to 135,000 employees between 1895 and 1916, and the various decentralization measures adopted in 1895, 1911, 1917 and 1926.

An enumeration of these measures would hardly be relevant. It is more to the point to mention two fundamental but little known legislative acts which are still valid, now more than ever, after apparently having been scarcely applied or not at all.

Between the Two Wars

We refer to a decree of 17 February 1921 and one of 3 August of the same year.

The first relates to two articles in the Finance Law of 13 July 1911 and institutes a budget implementation control. The budget was implemented by Posts and Telegraphs in the name of the minister, who was responsible for its management, and under his direct authority. The control function "is assigned to the Inspectorate General of Posts and Telegraphs, without in any way infringing upon the functions and responsibilities presently assigned to the Inspectorate of Finance." In executing their mission "inspectors will audit the conditions under which all expenditures are committed, accounted for, paid, approved for payment, and incurred; the tally of expenditures against services provided; the observance of purchasing and contracting regulations; the procedures followed to prevent abusive use or loss of funds, supplies and materials; the vouchers and records of cashiers and accountants pertaining to the accounting and settlement of sums due the Treasury; and the issuance and checking of numbered receipts."

"Inspectors will verify the legitimacy, need and timeliness of expenditures, with particular attention to the technical, economical and financial conditions under which expenditures are incurred, work projects are executed, and requisitions, purchases, receiving, warehousing, maintenance, transformations, transportation and materials are handled and processed. They will recommend any steps they deem advisable to simplify or improve operations and services.

"Auditors will not only obtain from the service chiefs of the central administration their departmental files and all information they may need, but they are also empowered to 'audit' departmental headquarters operations and management.... under special orders issued by the minister either spontaneously, at the request of the interested department head, or at the initiative of Control. These audits (must be) conducted in the presence of the chief of service or he must be duly invited to attend."

The committee of inspectors general prepared a comprehensive report that found whether activities had been carried out in the best interests of the government, indicated the improvements deemed necessary and recommended steps to be taken for more judicious use of budget credits. At that time, the Posts and

Telegraphs budget was part of the general budget, and inspectorate reports and responses to their findings and recommendations were forwarded to the minister of Finance.

Besides, an inspector general of Finance designated by his minister was a member of the committee of inspectors general that drew up the report. Chiefs of service were entitled to participate in a solely consultative capacity on matters concerning their services, and the departmental comptroller with right of argument.

The second above mentioned decree, that of 21 August 1921, ordered a reorganization of the Inspectorate General "modeled according to the organizational structure and auditing procedures of the Inspectorate General of Finance." The minister at that time, Yves Le Trocquer, felt that, for its consummation, the reform should "ultimately be accomplished by a statute organizing the Inspectors General of PTT on a definitive basis."

The changes effected by this decree were the creation, mentioned several paragraphs above, of a chief of service charged, under direct authority of the minister, with the responsibility for directing and coordinating the activities of the inspectors general through the issuance of all necessary directives, and for "ensuring general control of budgets." And, although regions⁶ were retained, they would be audited periodically by teams of control inspectors headed by an inspector general who would no longer be a member of a circumscription staff.

In 1923, the decree of 1921 was amended to distinguish between the Inspectorate General's technical and administrative specialist staffs. This was necessitated by the preponderant increase in purely technical activities within our service. Recognition of the commercial and industrial aspects of our services resulted in the institution in that same year of an autonomous PTT budget.

While administrative control inspectors were recruited through competitive examinations among administrative staff officials of PTT, their technical colleagues were selected from chief engineers or, if none were available, from regular engineers appearing on the list of candidates for promotion to the grade.

All subsequent legislative acts relating to the Inspectorate General, until 1941, dealt essentially with the recruitment, creation or abolishment of positions or grades (deputy inspector general). However, the decree of 16 December 1937 is worthy of note. It formulated the organization of the Inspectorate General, the number of employees, recruiting procedure and appointments, and discipline regulations, but defined its activities very succinctly and loosely compared with the 1921 decrees.

From 1921 to 1964

Four years later, a new text (the decree of 26 July 1941) again took up the organization of the Inspectorate General by establishing the number, method of

recruiting its members and the disciplinary regulations. It defined the Inspectorate's "essential role" as being "to continually inform the secretary general on the conduct of overseas operations and, on the other hand,.... to vitalize the departments with due regard for departmental control...."

This decree, despite several modifications, has stood for twenty-three years as the basic framework for the general auditing corps. Several attempts to remodel it were unsuccessful, although certain of its provisions have become obsolescent.

According to this decree, the chain of command starts with the secretary general, and no longer with the minister.

That provision must be viewed in the context of the period: The seat of government is Vichy (the secretary of state for Communications, with responsibility also for PTT, is Jean Berthelot), but the highest administrative echelon of our service remains in Paris, in order, no doubt, to avoid a potentially serious separation. The position of secretary general, created 9 February 1941, responds to this concern for maintaining an integral administrative organization headquartered in France's real capital. The minister himself, in view of his political responsibilities, must reside with the government at Vichy.

Under this decree, the chief of service, although reporting to the secretary general, is given greater autonomy in organizing and managing the activities of the corps.

"He apportions the staff of the Inspectorate General among the circumscriptions.

"He schedules and assigns missions, receives official copies of the special directives issued to the Inspectorate General, and forwards all reports and studies to the secretary general.

"To the extent permitted by the performance of his specialized functions, he participates in all audits and studies.

"Deputy inspectors general and control inspectors of the corps' administrative and technical staffs who are not attached to a particular circumscription are assigned to the chief of service of the Inspectorate General.

"These officials perform all tasks and missions assigned to them by the inspector general, chief of service. Those of the administrative staff may be utilized especially to make detailed audits of any department's activities or the activities of special sections, in accordance with the directives of the chief of service of the Inspectorate General and in coordination with the inspector general of the interested circumscription."

"The chief of service of the Inspectorate General assigns to inspectors general of its technical staff who are not assigned to a particular circumscript^{ion} any mission he may deem useful or any work that may contribute to the total effort" (art 14).

Another article stipulates that the staff officials of the Inspectorate General are responsible for all audits, inquiries, and studies relating to the organization or operation of other departments. It specifies that they perform audits of budget performance and direct the work of promotion and rating boards.

Lastly, competitive selection of candidates for administrative control inspectors was abolished. Candidates for the grade of deputy inspector general must already have attained a certain grade and appear on the list of candidates prepared by the central administration management board. The differentiation between the grades of deputy inspector general and control inspector was based on the prior salary level of the successful candidate¹⁰. This system of differentiation was quickly abolished by the law of finance of 31 December 1942 which transformed all specialized control inspector and deputy inspector general assignments into two inspector and twelve deputy inspector general positions.

However, when the reclassification of civil service employees took place in 1948, deputy inspectors general were deemed to have suffered downgrading by comparison with their previous relative position in the salary structure since their responsibilities were now comparable to those of inspectors general. In 1951¹¹, they became "2nd echelon inspectors general" and their colleagues "1st echelon inspectors general." Shortly afterwards, the officials of the technical staff were reclassified to 1st and 2nd echelon inspectors general in accordance with a decree of 5 July 1951 instituting an interministerial corps of telecommunications engineers.

During the 50's, several plans to reorganize the Inspectorate General were unsuccessful and the decree of 1941 was not rescinded until Decree 64-142 of 13 February¹² which established a specific statute of the corps of inspectors general.

The Reforms of 1964 and 1971

A decree of 28 April 1964 defined the role, organization and functions of the Inspectorate General as the highest control branch of the ministry of Posts and Telecommunications, placing it under the direct authority of the minister of Posts and Telecommunications and, through delegation of his authority, that of the secretary general. Although the minister was empowered to assign to it any mission, its permanent mission was to:

--Inform the minister at all times regarding the conduct of international operations

- Oversee the adherence of departmental activities to legislative and regulatory provisions
- Conduct inspections, investigations, verifications and studies of PTT's organization and administration
- Audit the implementation of the Posts and Telecommunications' autonomous budget and that of the Caisse Nationale d'Epargne [National Savings Institute]
- Develop a spirit of rivalry among services and vitalize the performance of their duties
- Participate in the selection of foreign service candidates for advancement and, in particular, preside over the proceedings of regional promotion boards and contribute to those of central promotion boards.

The role of the chief of the Inspectorate General is essentially one of coordination and representation although in principle he can also participate in audits, investigations and studies. He presides over committees, one of which is devoted exclusively to the preparation of an annual business plan which takes into account all recommendations "submitted by central administration managements for inclusion...." It is he who delimits the circumscriptions and assigns to them an inspector general or general engineer. It is his function to present an annual report to the minister summarizing the performance of the governmental administrations and formulating findings and recommendations for improving the Services.

Although the latter decree was not rescinded, Decree 71-609 of 20 July 1971 relating to the organization of the central administration of the ministry of Posts and Telecommunications placed the Inspectorate General in the general administrative hierarchy instead of solely within its foreign service branch, stipulated that it would function under the direct authority of the minister but that it "can be assigned missions of investigation or audit" by any of the directors general or directors of the central administration.... and "will report on the execution of these missions directly to them."

The latter provision became preemptive and the activities of the Inspectorate General came to be determined essentially by heads of central administration requesting the Inspectorate to include this or that matter in its schedule of activities and report back their findings and recommendations. In practice, the Inspectorate General found itself being called in more on administrative and management problems than on matters of concept and policy. The minister's cabinet rarely if ever called upon its expertise, and recommended to the Inspectorate General that it effect its own mutation:

- by requesting it [the cabinet] to detail to the chiefs of PTT's foreign service their functions and responsibilities;

--by bypassing the regional organizations in staff promotion matters and re-apportioning functions and responsibilities in such manner as to enable a single member of the central Inspectorate General to examine all the candidates for any given promotion; and

--by assigning investigations and audits to teams of three inspectors or general engineers working together with the central administration official whose activity was affected.

However, the Inspectorate General saw itself losing the chairmanship of the regional promotion boards for positions in the provinces, which would minimize its role as consultant to the board members.

This humiliating situation was resented, as much as was the fact that the Inspectorate General lacked sufficient funds and material, and premises appropriate to its needs.

Role of the Inspectorate General

After a period of hesitation and wavering, the secretary of state¹³ by letter order of 11 December 1975 based on the legislation in effect then¹⁴, assigned the Inspectorate General three objectives:

--Regular and systematic auditing of the foreign services and of the organizations under the tutelage of the secretary of state, which has resulted, since 1976, in a detailed annual report on each region and department and a composite report that is forwarded to the minister during the month of December

--Timely missions as in the past, but requested by the central administrative managements and forwarded to the minister for his prior approval to proceed or not

--The permanent role of organic engenderer of conceptual and analytical studies, forecasts and proposals.

These objectives were confirmed and elaborated on by a memorandum of the secretary of state addressed to the central directors on 3 June 1976 stating that:

--The Inspectorate General is a branch of the central administration¹⁴ and, as such, administers its own staff of inspectors general and general engineers¹⁵. The chief of the branch is empowered to engage certain expenditures inasmuch as the departmental budget is henceforth autonomous.

--The branch chief is responsible for establishing his own schedule of activities based on the requests made of him.

--Auditing of the implementation of its autonomous budget will henceforth follow the lines of procedure used by the Inspectorate General of Finance and will be effected by specialized teams headed by a general inspector or general engineer aided by class "A" officials assigned temporarily to the Inspectorate General.

--Inspectors general and general engineers may collaborate at times and for specified periods with departmental officials in highly specialized technical studies.

--Annual reports requested in letter orders must include an analysis of the state of morale in each region or branch of service.

The purpose of these measures was obviously to ensure greater participation of the Inspectorate General in the activities of the PTT.

Where Are We Today?

We will not refer to material working conditions except to say that they have been substantially improved.

As to the activities of the Inspectorate General: The secretary of state and his cabinet must endorse all requests by central directors for inclusion of items in the annual business plan of the Inspectorate General and may add their own items. The annual report on the regions and services is prepared by the regional inspector general or general engineer and permits the preparation of the composite report for the secretary of state.

Three budget implementation control teams have been formed. One of these, headed by an inspector general with the assistance of officials of Budgets and Accounting, functions at the regional accounting level (Dijon in 1976, Rouen in 1977)¹⁶. The other two teams, each consisting as of now of a total of five class "A" officials headed by a general inspector, have been operational, after a period of training, since June and have effected audits in the Dijon region on the following matters:

- budgetary receipts
- mail transportation contracts
- regional postal employee compensation
- building construction service
- long lines service
- regional telecommunications employee compensation.

These auditing procedures are undoubtedly burdensome on both the auditors and the officials responsible for the audited activity. But their purpose -- as the secretary of state has repeatedly emphasized -- is to guarantee to the satisfaction of Parliament and of public opinion the judicious use of the considerable autonomous budget sums now available to PTT. The rigorous and detailed auditing of the use of these sums has no other purpose. It must encourage the staff and those responsible for managing funds to treat their responsibility with due regard and concern for the public interest.

"Report, investigate, recommend." These are the three lines of action laid down by the secretary of state for the Inspectorate General.

This recall to the direct authority of the minister responds fully to the views of the members of the general control corps. It strengthens their independence of mind and spirit. Detached from the day to day events that confront those who bear the brunt of responsibility for government and from having to cope blow by blow with a situation in perpetual change, the inspectors general and general engineers of the Inspectorate General can operate with greater serenity and can approach the problems of Posts as well as Telecommunications with longer range objectives in mind.

The Future

The scope and diversity of missions assigned to the Inspectorate General demand officials combining outstanding qualifications. These men of strong character and distinct temperaments must bring to the general corps of auditors experiences of diverse natures, levels and durations, but at the same time a clear sense of duty, objectivity, and the public interest. The Inspectorate General therefore welcomes officials in the prime of their careers or capable of fulfilling the highest responsibilities on central administrative or foreign staffs.

This collaboration among personalities of diverse educations, characters, careers and ages is a source of ideas and action. It is made possible by, above all, a greater latitude in the choice of candidates (graduates of the two national institutes of higher learning technology and administration and carefully screened class "A" officials), but also by a restoral, perhaps in the near future, of the function or grade of control inspector. The Inspectorate General offers these officials a career or a step forward in their professional lives.

This broad recruiting policy is bound to be reflected in the scope of the Inspectorate's activities and in its work methods. We have already discussed the auditing teams each headed by a general inspector. We can envision the formation of permanent, specialized, conceptual and analytical study teams of general inspectors and general engineers capable of tracking events in a constant state of change.

An Inspectorate General with the professional qualifications and the necessary means for accomplishing its mission undoubtedly represents an asset for the efficient operation of government services. Far from conferring on the control concept an excessive and psychologically paralyzing sense of formality, the qualities and rich humaneness of these officials must:

--Assist the chiefs of foreign services to better fulfill their role

--Make their views available to the central administrative staff as to the most suitable lines of development

--Assist the minister in leading his Administration to increasingly better responses to the public need.

Thanks, therefore, to an appropriate legal statute, to the careful selection of its staff, and to the personal volition of the minister to accord it his effective support, the Inspectorate General is able to participate, as is its desire, in the development of PTT's public services and, through them, to contribute to the advancement of communication among peoples.

This summary instruction [handwritten note in sidebar], carefully penned by an "epeditionnaire" (writing clerk of that period), remained in effect from 1880 to 1890.

Summary Instruction to the Posts and Telegraph Services concerning the Inspectorate General of Control

The Inspectorate General responsible for Control is placed under the direct orders of the Minister.

It conducts periodic checks on all branches of the service.

Control Inspectors are assigned the mission of determining that all instructions of the Central Administration and regulations are being duly implemented, and the faults that may exist in the planning and construction of telegraph lines and the means of transporting mail by the postal system; recommending appropriate measures for correcting these faults; determining whether the organization and operation of services responds adequately to the needs of the population, and whether the rules and regulations governing both services are without exception being scrupulously observed.

Their authority extends without distinction to technical as well as operational matters. Personnel of all grades (chiefs of service and other officials) must diligently assist them by producing all documents and information they may [text incomplete]

FOOTNOTES

1. Napoleon I, upon instituting the Cour des Comptes (law of 16 September 1807), declared: "I desire active supervision to eliminate irregularities and guarantee lawful use of public funds."
2. Readers are referred to the interesting article by Mr Jacques Auboyneau, inspector general of Finance, on "The Inspectorate General of Finance" which appeared in the REVUE DES PTT DE FRANCE number 6-1976, and to the REVUE's "Dossier du Mois", number 3-1977, which deals with "La Cour Des Comptes."
3. It is not within the scope of this article to discuss the different recruiting methods used by these Inspectorates.
4. LA REVUE ADMINISTRATIVE number 134-1970.

5. Institution of its Revenue Collection Service in 1879, its Service of the CNE [National Savings Institute] in 1882, of Telephones in 1889, of Collect Parcel Post in 1892, and of Postal Money Orders in 1918.
6. Circumscriptions.
7. This was the case of the majority of the ministries.
8. Notably, executive decisions of 19 March 1941, 21 January 1942 and 3 February 1943, signed by the secretary general and delimiting the circumscriptions, all included the regions of Nancy and Strassbourg despite Germany's de facto annexation of Alsace and part of Lorraine.
9. Actually, there were only two organized competitive examinations: one in 1926 for eight positions and one in 1932 for five positions.
10. Successful candidates having a salary at least equal to that of a section chief were appointed deputy inspectors general. Those who did not fulfill this condition were appointed control inspectors.
11. Finance Law of 24 May 1951.
12. 1st and 2nd echelon inspectors general became inspectors general without echelon.
13. Executive decision of 1964 and decree of 1971 (see above).
14. This provision of the decree of 1971 had become a dead letter.
15. The 1978 budget provides for one chief of service, eighteen inspectors general and fifteen general engineers.
16. Regional head offices are audited under the provisions of Executive Decision 2404 of 15 September 1971 which stipulates in article 11 that "regional accountants will be audited by the Inspectorate General of Finance and the Inspectorate General of Posts and Telecommunications."

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FRANCE

NEW RAILWAY MAIL CAR DESCRIBED IN DETAIL

Paris REVUE DES PTT DE FRANCE in French 1978 No 1, pp 18-30

[Part two of article by Daniel Jarreau, engineer in the Equipment and Transport Directorate of the General Directorate of Posts]

[Text] This text, describing the construction and facilities of the new railway mail car continues a first article published in the REVUE DES PTT DE FRANCE, 1977 No 5, which reviewed the history of the study of this vehicle, describing its place in relation to the other vehicles of the post office rolling stock fleet.

Framework of the Chassis and Body

The Chassis

Constituting the lower portion of a tubular beam the chassis consists of:

two UAP 200[side sills of half hard weldable copper bearing steel joined together, in part by the flat plate pivot cross members and in part by the IPN 160 I cross members, these elements being assembled by oxy-acetylene welding;

two UAP 200 struts at right angles to the buffers which connect the forward cross member to the pivot cross member;

a central compartment arranged to house either the tractive elements or the automatic coupling elements; and

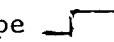
two gussets (lower and upper) enclosing the front of the chassis practically over the length of the automatic coupler compartment.

The chassis is covered over its entire surface between the pivot cross members by ribbed sheet metal flooring 1.25 millimeters (mm) thick.

The Body

The body, which constitutes the upper portion of the tubular beam with load bearing skin, consists of an overall flat sheeting 2 mm thick, achieved by butt welding the various constituent elements. This sheeting is attached to vertical uprights and Z-shaped formed sheet metal stringers.

At the top an L-shaped formed sheet metal profile, 3 mm thick, serves to brace the framework.

In addition, a stringer in the shape , 2.5 mm thick, at about mid-height on the sides, extends between the uprights. All these elements are welded together and joined to the side sheeting by stitch welds.

The assembly thus formed is joined by means of the uprights to the entire height of the side sill webs and by means of the upper edging above described to the longitudinal edge member of the roof consisting of a formed sheet metal profile 4 mm thick.

The walls of the ends of the box forming the shock absorber consist of formed sheet metal uprights 3 mm thick arranged in two groups, one on each side of the longitudinal axis of the vehicle. These uprights serve to support the end sheeting, 3 mm thick, which bounds the box, strictly speaking.

Beyond the end walls a streamlining device in the form of hoods which are extensions of the faces and of the canopy serve to support the flanged car-to-car joints.

The roof, which forms an integral part of the tubular beam, includes a framework consisting of curved arches and five longitudinal members of Z-shaped formed sheet metal. The five Z-shaped longitudinal members are supplemented by five formed continuous sheet metal longitudinal members, with the shape , which are situated below the flanges of the preceding longitudinal members.

The edging of this framework consists of a  profile of formed sheet metal 4 mm thick which permits assembly to the upper edges of the sides. This edging is reinforced at its ends by a profile of formed sheet metal 3 mm thick which begins at the shock absorber and extends beyond the loading door.

Upon this framework a sheet metal canopy, 1.5 mm thick,* is welded.

* As for the feeder car, the sheet metal for the canopy is aluminum alloy, 2 mm thick; assembly of the sheets is by riveting.

Spandrels between every two curved members consist essentially of formed steel angle sections, 3 mm thick, assembled by welding, and whose joints are reinforced by gussets. On the other hand the spandrels at right angles to the partitions of the accessory compartments consist of a vertical web of sheet steel, 2 mm thick, stiffened by formed sheet metal angles, 2.5 mm thick.

In the central portion of the roof there is an opening intended for intake of external air.

At each end of the roof framing there are compartments of flat sheet metal intended in particular to house the water tanks of 290 liters and 50 liters capacity.

Bogies and Braking Apparatus

The factors to be considered in selection of bogies are numerous and varied. Let us quickly enumerate some of them: maximum desired speed, comfort, possibility of installing braking dependent upon the loading, ability to place an alternator upon the bogie, feasibility of attaining maximum body width, length of service life, same bogie for the railway mail car as for the feeder car, greatest possible number of parts in common with the bogies in present use by the SNCF [French National Railroads], and so forth.

Some Ideas on Bogies (Load Bearing)

The bogie is a small truck with two axles upon which a portion of the vehicle body rests and intended to permit better seating of the body and facilitate swiveling of the vehicle around curves.

In the case of bogies the load is supported upon a special element of the latter called the floating crossbar whose mobility, combined with the flexibility of the suspension, considerably improves comfort. The suspension consists of two distinct parts:

the suspension of the bogie strictly speaking, or primary suspension; and

the suspension of the floating crossbar, or secondary suspension.

In addition, connecting rods, snubbers and other subsidiary parts connect the various constituent elements together. These parts transmit the vertical and horizontal forces while moderating them in order to alternate and reduce the various relative motions such as sway, pitch, roll, and so forth.

The Y24X Bogie: Construction and Special Features

Suspension of the bogie, strictly speaking--The load on the bogie is transmitted on each side to the two axle boxes by longitudinal balancing beams. The frame of the bogie rests upon each of these balancing beams through two groups of coil springs.

Suspension of the floating crossbar--consisting of a transverse beam, the floating crossbar rests upon the above mentioned frame through two groups of coil springs.

The floating crossbar bears a central spindle and two slide blocks, one at each end. The load is applied to the two lateral slide blocks with a part of that load being transmitted at right angles to the spindle through a coil spring.

Automatic Braking--The braking system, on discis and on the wheels, on each bogie consists of the following parts:

two discs upon which the force exerted upon braking is constant, whatever the load upon the bogie; and

sixteen brake shoes acting upon the wheels which exert upon the bogie upon braking a force proportional to the load. For this purpose a hydraulic-pneumatic pressure reducer is situated in the first stage of the suspension; it controls a regulating device which mechanically varies the force applied to the brake shoes.

Manual Braking--Controlled by a wheel located on the partition of one of the accessory compartments, the manual brake acts upon the brake gear of one of the two bogies through a cable.

Electric Power Supply

Batteries and Their Supply

Two banks of storage batteries supply the 24-volt system of the vehicle. Each consists of 12 lead-acid batteries with rated capacity of 495 ampere-hours at continuous discharge in 5 hours. Recharging them is effected in either of two ways, depending upon whether the vehicle is alongside the station platform or is running:

at the platform, by connecting to the EDF [French Electric (Power) Company] lines; recharging is provided by a three-phase transformer rated at 10 kilovolt-amperes, 380 volts, 50 hertz; and

on the road, recharging is provided by two three-phase alternators, each rated at 4.5 kilowatts. Each alternator situated upon a bogie is driven by five parallel V-belts from an axle pulley. Each alternator has a rectifier-regulator which, in addition to rectifying the alternating current performs the following two functions: regulation of the output voltage for charging the batteries and regulation of the maximum current output of each generator.

The Platform-Side Supply Transformer

The three-phase transformer above mentioned has three secondaries, two of which supply the batteries, while the third supplies the operating circuits of the car.

1,500-Volt Supply

A high-voltage power supply (1,500 volts) is provided. It will be provided either by the railway power line from the locomotive or a 1,500-volt connection at the platform.

Heating and Ventilating Equipment

As stated in a previous article this equipment was the subject of very intensive investigation and study. As a matter of fact, considering the highly specialized use of railway mail cars, heating and ventilation necessitated development of original solutions.

Principles of Solutions Adopted

The main heating is accomplished by means of hot water radiators, whose thermal inertia is always to be appreciated.

However, to increase the rapidity of bringing the vehicle up to required temperature and improve the vertical temperature gradient, at the top of the vehicle in the middle of the sorting room, between the ceiling and the canopy there is installed a forced air heating unit with water-air heat exchanger.

Without hot water this latter system can serve to ventilate the car by means of intake of external air.

Brief Description of the Installation

The boiler has combination heating and can operate either electrically at 1,500 volts or with liquid fuel burner, or even, but under certain conditions, by using both these energy sources simultaneously. The installed thermal capacities are as follows:

40 kilowatts for the water heater with burner; and
40 kilowatts for the water heated electrically.

The water heating unit is a unit assembly consisting of the following elements:

The water heater--At the upper part is the water-gas exchanger. It consists of two cylindrical shells held in position at their extremities by two very thick steel plates having two suspension brackets; one serves for seating the burner, the other the smoke box.

The inner shell forms the furnace into which the flame from the mouth of the burner enters. The water circulates between the two shells, directed by helical fins which force it to circulate around the furnace.

At the lower part, a tank between the two seating plates is fitted with 48 transverse tubes to receive the electrical heating elements.

The burner--This is similar to the burners used in boilers used in buildings with its fuel supply, turbine blower, ignition transformer, ignition apparatus and safety devices. However, the ruggedness and reliability of this equipment must be foolproof, the operating conditions being vastly different from those present in fixed locations (vibration, contamination, and so forth).

The smoke box--A part intermediate between the heater and the chimney, the smoke box is made of stainless steel sheet highly heat resistant and having very good corrosion resistance.

It includes a housing for mounting a pyrostat and a tube for water drainage.

Gaseous combustion products exhaust chimney--This chimney, which connects the boiler, located on the chassis, to the chimney outlet on the canopy passes through the sorting room. Particular care has been taken with the passages through the floor and ceiling from the standpoint of thermal insulation.

The outlet on the canopy is provided with a deflector which causes a lowered pressure in the chimney while the car is moving.

Safety and regulating devices*--In case of excessive rise in temperature of the combustion product gases a pyrostat causes the heating installation to be shut down.

On the hot water header (mounted in immediate proximity to the heating unit outlet) are three thermostats:

a safety thermostat which shuts down the heating when the water temperature in the boiler exceeds 90°C [Celsius];

a regulation thermostat which limits to a maximum of 750°C the water temperature in the boiler; and

a thermostat for release of preheating ventilation which does not allow such ventilation to operate until the water temperature in the boiler reaches 40°C.

* In addition, warning signals are given in event of:
stopping of the motor-pump unit;
extinction of the burner flame;
abnormally low water level, and
absence of fuel.

The ceiling water-air heat exchanger (ventilation and air heating unit)--This exchanger consists of finned tubes over which a motor driven centrifugal blower directs air.

The heating-ventilation unit assembly is shock-mounted and the speed of rotation of the motor was chosen as low as possible (about 1,500 revolutions per minute), all with the end in view of reducing noise and vibration to the greatest extent possible.

The thermal capacity of this exchanger can reach 20 therms per hour [1 therm = 1 million calories].

Piping and radiators--Piping is seamless steel tubing and radiators consist of finned copper tubes providing a good heat exchange coefficient as well as suitable corrosion resistance.

Placement of the radiators was the subject of tests with models, tests made necessary, on the one hand, by the size of the sorting room, (above all, in wall space) and, on the other hand, so that the platforms where the sacks are piled not interfere with general diffusion of the heat.

Air Distribution Ducts (for preheating or ventilation)--These ducts facilitate diffusion of air to the various compartments. Connected to the ventilation and heating unit, they are attached to the framework of the canopy above the ceilings of the various compartments. Thermal and acoustic insulation of these ducts was the subject of decided attention.

Thirteen adjustable baffles allow for distribution of the air.

Operation

Heating may therefore be effected either by the hot water radiators alone (switch in the position "water heating") or by these same radiators after a period of preheating provided by the water-air heat exchanger and its ventilation (switch in the position "water-air heating").

In the latter case (the only case presenting some special features) the operation is as follows:

Interior temperature below 18°C--the unit under the canopy is preferentially supplied with hot water and the air blower does not start up until the temperature of this water reaches about 40°C. In addition, provision is made for recirculating of interior air (about four-fifths of the air blower intake) in order to increase the speed with which the vehicle's atmosphere attains desired temperature.

After this temperature has been attained an automatic regulator allows choice among three operational instruction values: mini-normal-maxi, corresponding,

respectively, to 20°C, 22°C and 24°C [at the location of the ambient thermostat located above the register in the ceiling at the middle of the vehicle.*]

Interior temperature higher than 18°C but below the posted value--in this case ventilation and preferential circulation of water in the unit below the canopy is stopped; it is the hot water radiators which provide the heating.

Ventilation--In summer the previously described ventilation system can be used to circulate fresh outside air (switch in the position "ventilation"). Intake of fresh air is effected on the exterior of the vehicle; it is accomplished by means of a duct attached to the water-air heat exchanger and terminating in an opening in the canopy sheeting.

Untapped steam line--Although no provision has been made to use steam as a source of heating, the car is equipped with an untapped steam line in order to provide continuity for this service from car to car.

Electrical Equipment and Sound System

Power Distribution

High voltage wiring--This concerns the general 1,500-volt supply.

The main line is protected by a copper tube, 2 mm thick, and by a fluid-tight flexible metallic sheath and is terminated at each end by cables for car to car connections.

The car's own supply wiring is protected by steel tubes.

Low voltage wiring (for lighting, heating and braking)--Different circuits are necessary in order to perform the various functions provided upon the car.

380-volt circuit--This concerns the platform-side supply for the transformers-rectifiers.

72-volt circuit--This concerns the lines for electro-pneumatic control of braking.

24-volt circuit--This concerns the supply for the car's own functions (lighting, heating, ventilation and hot plates).

Lighting

Lighting is by fluorescent lamps supplied by individual inverters to obtain a minimum of 300 luxes on the work tables in the sorting room.

* The location of this thermostat (there is no ideal location) explains why sometimes, in consideration of varied conditions (regions which are colder than others, opening of doors occasioning temporary local cooling) the temperature at the level of the thermostat must reach 24°C in order to obtain a suitable temperature at a man's height.

The sorting room is equipped with:

20 ceiling units of 40 watts for 1.20-meter tubes; and
2 ceiling units of 20 watts for 0.60-meter tubes in continuous reflectors.

Each platform is equipped with:

3 ceiling units of 40 watts for 1.20-meter tubes; and
1 ceiling unit of 20 watts for a 0.60-meter tube.

The accessory compartments are each equipped with a ceiling unit of 20 watts for a 0.60-meter tube.

Sound System

The purpose of the sound system is to provide communication with the cars from a central post. This equipment includes general wiring, an amplifier unit and a loudspeaker in the ceiling of the sorting room.

Other Electrical Equipment

The other electrical equipment (razor receptacle, hot plates and refrigerator) will be mentioned during discussion of the corresponding compartments.

Water Supply and Its Heating

Water supply for each of two compartments (toilet compartment and lavatory compartment) is provided by two reinforced polyester tanks:

one tank of 290 liters capacity; and
one tank for hot water supply of 50 liters capacity (the heating of this water is accomplished by a copper coil placed in the tank and connected to a hot water pipe of the heating circuit).

Finish and Insulation

The acoustic and thermal insulation is particularly elaborate, its importance being extreme from the standpoint of heating and comfort in general. The detailed description which follows of the flooring, facings, and ceiling, with the help of the sectional plan, will make the construction understood. It goes without saying that the selection of materials utilized took into consideration their behavior to fire and that in general the latest regulations related to them, in force in the SNCF, were applied.

Flooring

Sorting room and platforms--The support structure consists of wood (doussie, iroko, azobe or belingua) longitudinal and transverse joists. The woods used must have excellent durability, compressive strength and resistance to rupturing and shearing.

These joists are attached to the plating by means of threaded studs but with rubber washers between the joists, properly speaking, and the nuts.

Starting from underneath the vehicle, one sees successively the following products and materials: two layers of "Insonastic," the plating sheet metal, two layers of "Insonastic," a cushion of mineral fibers (between the joists), asphalt felt between joists and flooring strictly speaking, the latter consisting of 15-mm thick plywood attached with wood screws to the supporting structure, and last, 4-mm thick linoleum, the thickness of the whole is 80 mm.

Accessory compartments--The floor in these compartments consists of a polyester pan itself within a pan of stainless steel sheet, 1.5 mm thick.

This stainless steel pan rests upon joists of formed sheet steel welded to the plating. The "Insonastic" and mineral fiber insulation is retained.

Facings and Ceiling

The interior finish facings consist of electro-galvanized steel sheets, 1 mm thick (platforms and sorting room) and panels of stabilized laminated plastic, 3 mm thick (accessory compartments).

The ceiling is perforated, pre-lacquered, sheet metal.

The finish facing and the ceiling facing are screwed to a wooden support structure attached to the framework. As with the flooring precedingly described, one will find, starting with the side sheeting: paint, side sheeting, "Insonastic" layers, mineral fiber cushion (between supports), asphalt felt, and interior facing.

Doors, Window Openings and Intercirculation

Personnel Access Doors

The car has two personnel access doors at the ends of the car on opposite sides. These doors are UIC type, folding, with unequal panels, and have locks to put them out of use, operated by a key from the outside, as well as a remotely controlled bolt operated from inside and outside.

Loading Doors

Each side of the car has two loading doors allowing access to the platforms. These doors, 1.60 meters wide, are of single-panel sliding, folding type. Entirely of metal, each has two fixed window openings. In open position they slide into metal housings provided with inspection parts which provide access to the suspension rollers and the bottom guide rails.

These doors are put out of use by two locking bolts operated from the inside (one by remote control, the other manually).

Such doors have for a long time been installed upon 21.57-meter feeder cars; they have been proven, notably as far as the various safety devices and tightness are concerned.

Window Openings

In addition to the window openings in the doors and those to admit light into the accessory compartments, there is only one window opening on each side (approximately in the middle of the sorting room). Those two openings have inside latches.

Passage Between Cars

At the ends of the car the doors are of UIC type with a device for blocking them open. Passage is provided by rubber flanges and UIC bridges of retracting type. These doors are put out of use by a bolt operated remotely from the outside or the inside; an additional bolt operated only from the inside has been added.

Steps

In consideration of the location of the loading doors (as shown in the diagram of the mail car in the preceding article they are at right angles to one end of a bogie) the tread plate is very small because, on the outside, the clearance limits of the SNCF impose a limitation and, on the inside, the necessary clearance must be provided for the bogie when going around a curve. To this must be added the relative play or movement of various parts, as well as wear, which must be taken into account in calculating the required free space.

The steps to the personnel access doors are situated in a recess in the car's chassis, the depth at this location being satisfactory. Likewise, the bottom plate is of suitable width, no part interfering here.

Tests

It can readily be seen that so complex an assembly, during erection and assembly, requires numerous tests, for the chassis-body as well as for the various accessories taken one at a time (braking, heating, dust removal equipment, and so forth) as well as the entire mounted assembly.

Without wishing to expand this more technical aspect, which would require a separate presentation, let us cite several of these tests.

Tests of the Chassis-body by the SNCF

These tests were performed upon the chassis-body of the feeder car which has the same structure as the mail car except that the loading openings are 2.40 meters wide instead of 1.60 meters wide as in the mail car.

The test objectives were:

--to verify the mechanical strength of the chassis-body subjected to static compressive and tensile stresses and vertical loads as follows: compression upon the buffers, 2 meganewtons (MN) (200 tons); compression upon diagonally opposite buffers, 0.5 MN, (50 tons); axial compression, 2 MN (200 tons); axial tension, 1.5 MN (150 tons); compression upon the end walls at various levels; and vertical load by means of weights of 53 tons uniformly distributed over the car's floor.

In the course of these tests stresses must not have exceeded the elastic limits of the steels utilized (except that in the test under load the stresses must have remained less than four-fifths of such elastic limits).

--to study the vibration behavior of the body under vertical excitation.

The body was excited at the middle by means of a hydraulic jack in the vicinity of the resonant frequency of the assembly. The amplitude of the vibration at various points of the body were measured; certain limits fixed by the SNCF standards in effect must not have been exceeded.

Inspection During Construction of the Chassis

It consisted of inspection of the following (the very tight dimensional tolerances--on the order of a few millimeters--are variable, depending upon the points examined):

outside dimensions of the chassis;
squaring of the longitudinal stringers;
verification of the axial planes of the pivot cross members;
squaring of the head cross member; and
inspection of the deviation of the mounting axis of each buffer.

Inspection During Construction of the Shell*

plumb and squaring of the sides;
true flatness of sides;
position of canopy battens;
square of canopy;
skew between pivot cross members;
twist of the ends;
skew, true flatness, and geometry of doors and windows;
sag of completed shell; and
height of shell.

* "Shell": a trade term designating the stripped body of the vehicle. The body assembly with sheeting and all welded components but without the buffers and sub-assemblies attached with screws or bolts, [Note: "shell" seems the most appropriate English word to translate the French word used--"chaudron"--which means small boiler or caldron.]

Some Inspections and Verifications

Inspection and verification of the braking systems, because of the originality of the adopted solution, necessitated development of a completely specific test procedure.

Electrical and thermal tests:

- measurement of resistances to ground;
- tests of dielectric strength;
- measurements of insulation resistance;
- general inspection of wiring;
- inspection of generating equipment and the ensemble of platform-side supply; and
- tests of ventilation and heating equipment (power consumption, controls, efficiency, noise, and so forth).

Interior Arrangement and Facilities

The Sorting Room

Sorting tables--The tables are placed against the car's sides and the partitions separating the sorting room from the platforms. They are attached in part by metal screws driven into plates welded to the car's structure and in part by lag bolts into the flooring joists.

They are unit assemblies wholly of metal assembled at installation in the vehicle; the vertical sides are partially perforated to allow free circulation of air warmed by the radiators located beneath the sorting tables. The tops of the tables are covered with bonded linoleum, 4 mm thick, and their exposed edges trimmed with a rubber hosing forming a stop for the sacks.

The tables are fitted with:

- sheet steel partially perforated shelves;
- two small drop-tables in the open bays; and
- draws and large equipment chests mounted upon roller slides which can be locked closed.

Sorting pigeonholes--These are made of perforated, anodized aluminum sheet elements, 1.2 mm thick. They are arranged side by side on the sides of the car, attached by screws (with felt washers) to plates welded to the side structure and plates set flush in the plywood of the partitions separating the sorting room from the platforms.

The sorting room is provided with 324 small pigeonholes (21 centimeters wide) and 212 large ones (28.5 centimeters wide); the depth (28.5 centimeters) is the same for both. It must also be observed that the interior of these pigeonholes (plane of support for letters) is inclined to the rear (about 10 degrees).

Seats--The sorting room is provided with nine swiveling seats consisting of upholstered stools.

These seats can be put out of the way under the sorting table and can be set at two different heights in relation to the sorting table level.

Dust removal tables--Two dust removal tables, one on each side at the extremities of the sorting tables and continuous with them are installed in the sorting room.

Their operation is as follows: the sacks are emptied onto a perforated horizontal plate underneath which is a hopper connected to a removable filter intended to remove dust from the air before it is redirected into the car. The aspirated and filtered air is directed into the sorting room through a V-shaped duct located between the sorting pigeonholes and the face covering; it must be emphasized that the aspiration velocity must be high enough at the filter to achieve effective action but in contrast the diffusion velocity of that air into the vehicle must be as low as possible; for this reason it is directed through a very wide duct to its ceiling so as to avoid its blowing directly upon the occupants.

The motor driven ventilator is mounted elastically and the assembly is soundproofed.

Control is effected by means of a control box attached to the side of the sorting room to the right of, and below the dust removal table.

Miscellaneous--Stamping plates and writing desks complete the equipment of the sorting tables.

Bars upon which sacks are hung are installed at right angles to each of the central openings and upon each side of the sorting room toward the end sliding doors.

An emergency guide rail is situated above the sorting pigeonholes and sliding door and leads to the manual brake platform.

Platforms

These platforms with working surface of about 12 square meters must allow for storing mail sacks (intended for, or coming from the sorting room), passage for access to accessory compartments and to the access doors, and passage between cars, all while not obstructing the loading doors.

Each platform has nine vertical straps whose ends are fastened to anchoring devices, one in the floor and the other in the ceiling. These straps are intended to serve as operating stations for the mail sacks in order to limit their territory.

At each platform there also are:

the hot water radiators and a ventilation-heating ceiling register;
a mail box intended to receive mail posted by travelers at the
station platform;
two dry fire extinguishers; and
a hammer for breaking window glass.

Accessory Compartments

Access to these four compartments is through sliding doors which recede into the longitudinal double partition separating the accessory compartments from the platforms. As a matter of fact it was a question of encroaching neither on the platforms nor the compartments by swinging doors.

Toilet-Kitchen

The "toilet" compartment (a toilet and small washstand) includes:

a toilet bowl with flopper valve operated by a pedal which at the same time provides flushing;

a small washstand. Water supply is provided by a swiveling goose neck from two faucets, one mounted directly below the 50-liter hot water tank, the other directly below the 290-liter tank. These faucets are actuated by floor pedals below the washstand; and

miscellaneous accessories (soap dispenser, towel holder, and so forth).

The "Kitchen" compartment includes:

a 500-watt hotplate (width 270 mm, depth 370 mm, and height 430 mm);

two small stainless steel tables;

a garbage receptacle with removable pail;

a medicine cabinet; and

a refrigerator (interior temperature maintained at $4^{\circ} \pm 1^{\circ}\text{C}$) whose inside dimensions are: width 395 mm, depth 400 mm and height 750 mm.

The development of this last named accessory was a rather ticklish problem. As a matter of fact, on the one hand such equipment is not generally manufactured with direct current motors and, on the other hand, the vibration and shock inherent in railroad equipment can affect it.

Lavatory-Cloakroom

The lavatory compartment includes:

a washstand (water supply is provided in the same way as for the washstand located in the "toilet" compartment);

a folding bench;
a 220-volt alternating current receptacle for shavers;
miscellaneous accessories (soap dispenser, towel holder, mirror,
and so forth).

The cloakroom compartment includes:

two shelves; and
two suitcase racks.

Miscellaneous Facilities

At the ends of the car are the regulation signal carriers.

Upon each of the sides are the rings and special supports for direction markers.

A reinforced neoprene beading intended to protect the longitudinal sides of the car is attached to them and forms a belt around the body.

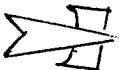
Painting and Markings

Painting

The exterior of the car, completely painted brown-red with polyurethane lacquer, carries the regulation markings (see following). Preparation of the surfaces and application of the paints and various materials demands careful attention in order to avoid numerous defects (orange peeling, crazing, cracking, and so forth). A precise operating procedure, which is the subject of technical specifications, must be observed.

The inside of the car is finished with green-tinted flat glycerophthalate lacquer.

Markings

The plan shown in pages 10 and 11 of the preceding article shows the locations of the "POSTES" markings and the emblem 

Numbering, and remarks concerning numbering--Each car is numbered in accordance with the SNCF. As a matter of fact, the 12-digit numbering is the result of international agreement (UIC). For example, the number of a railway mail car could be: 51 87 00-87 057 0, where the first two digits (51) are code for the rules of exchange among the different countries; 51 designates the use which can be made of cars in international service;

the following two digits (87) are code for the various railroad administrations (Federal Republic of Germany: 80, Belgium: 88, France: 87, and so forth;

the fifth figure characterizes the nine main types of car (0: Posts and Telecommunications cars, 1: first class seating cars, and so forth).

the sixth digit is used to indicate the number of compartments of bogie-mounted cars; in this case 0;

the seventh digit indicates the maximum speed and heating characteristics of the car (8: maximum speed greater than 140 kilometers per hour and electrical (and possibly steam) heating;

the eighth digit is combined with the seventh to indicate the electrical power supply used (7: 1,500 volts, direct current or 50 hertz single phase alternating current);

the ninth, tenth and eleventh digits constitute the car number strictly speaking in its series (here it is the 57th car of this type); and

the twelfth digit is a control for the correctness of the other 11 digits.

In domestic service the car number is sufficiently defined by the fifth to eleventh digits, which are underlined on the car (00-87-057).

Other markings on the side--without detailing all these markings (some, such as those related to electric supply or to length between buffers or between pivots being almost self-evident) let us simply point out the following:

- marking denoting car with sound system but without central station
- △ R marking for cars equipped with class R brakes for fast trains
- E or □ ep marking indicating car equipped with electro-pneumatic brakes
- D marking indicating the car is equipped with disc brakes.

Markings at the back of the car--on the door jam of the car is a table intended to summarize information related to acceptance and maintenance of the car, as well as the marking L_0 which is a mark of compatibility for use in making up trains.

At the end of this presentation it is undoubtedly not unnecessary to wonder whether, on the one hand, the car fulfills the requirements, and on the other hand, whether it behaves satisfactorily in course of time.

Experience (soon the first cars will have been in service for 4 years) has shown that the 26.40-meter railway mail car satisfies the needs of its users. Without breaking away from the traditional modes of performing traveling services, it provides comfort in the broad sense better adapted to what one is today accustomed and it facilitates, by virtue of its large size and various means of access, the loading and storing operations.

Several of these railway mail cars having undergone general overhaul, it was possible to verify the excellent performance of the structure (assembly of parts, welds and so forth), of the materials, as well as air-tightness.

This satisfactory balance sheet justifies the precautions which had been taken in its studies which preceded beginning of construction (investigations, models, varied tests, and so forth) and allows us to pay homage to the various companies and enterprises which participated in this accomplishment, particularly the SNCF and the D. Soule establishment.

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GREECE

PROBLEMS IN PROGRESS OF EXPANDING TELEPHONE SYSTEM

Athens O OIKONOMIKOS TAKHYDROMOS in Greek 13 Apr 78 p 18

[Article by G. Papanikolaou: "Getting Worse Every Year"]

[Text] When the first satellite went into orbit in October 1957, it marked the beginning of a new era characterized by the tremendous development of telecommunications.

In this context and judging from the intervening two decades, our country has made significant progress in the field of both domestic and international telecommunications.

However, needs have grown apace with the improvement of the national standard of living and economic development, and have now become pressing.

As shown in charts 1 and 2, the yearly demand for new telephone installations has at least remained steady. On an average, about 200,000 applications are being submitted every year throughout the country, out of which 100,000 are for the capital area.

Unfortunately, however, the same charts show that fewer applications are being approved every year, and as a result, more applications are consequently left pending.

Thus, the repeated statements made by the OTE [Greek Telecommunications Organization] according to which "144,000 new telephones will be installed in the capital area alone during 1978" (TA NEA 3 Feb 78) should not be taken too seriously unless they are compared to the number of applications now pending, as well as to those which must already have been submitted.

Already, 498,722 applications for new telephone installations are pending throughout the country, compared to 347,765 in 1976.

This situation becomes evident from chart 3, which refers specifically to certain areas of the country and shows the corresponding dates when applications were submitted.

Among the data provided by the OTE are mentioned some of the most discouraging cases.

In the Salonica area, applications have been pending since 1971, while in the capital area, they have been pending since 1973.

Charts 4 and 5 show the rise in the use of telecommunications media, as well as the rise in domestic long distance calls in units (347 million in 1977 as compared to 309 million in 1976). They also show the increase in out-going international calls for first-minute conversations (60,624,844 in 1977 as compared to 50,295,343 in 1976).

It should be noted that according to information provided by the OTE, the plan to install 850,000 new telephones during the period 1976-1980 is being pushed through, following approval by the government.

However, 500,000 applications are still pending, and an average 500,000 new telephones are installed every year. If we estimate that the number of new applications is remaining at a relatively low level--since the inability of the OTE to satisfy demand is well-known--then we shall still be behind in 1980 and at least 100,000 new applications, if not more, will be pending.

The same is also true of Telex installations.

As shown in chart 6, the attempt to fill the new applications submitted for Telex machines was not sufficient; as a result, 1,119 applications are still pending.

Lower Investments

A consoling note is struck by the rise in telecommunications automation, a field in which our country presents one of the highest percentages: about 99 percent in 1977.

Years	Automated Switchboards	Manual Switchboards
1975	1,021	2,820
1976	1,077	2,774
1977	1,128	2,700

(The high number of manual switchboards covers a small percentage of the telephone network).

However, the main factor which proves that the future of telecommunications in our country is not as bright as are the needs for the development of this sector, is the decrease in investments.

While 4 billion drachmas were invested in 1974 and 1975 respectively, and again 4 billion in 1976, barely 3.5 billion were approved for 1977, when at least 5 billion were needed.

The level of capital investment for 1977 is the same as the 1973 level!

Thus, not only is it impossible to satisfy present needs, but telecommunications are also prevented from playing a fitting role in the development of our national economy.

Following the transfers from Beirut and the establishment in Athens of many new headquarters of international enterprises, it would have been more advantageous to deal more carefully with the future of telecommunications rather than simply attempt to fill part of the applications and at the same time to create a sensation among the public by announcing the approval of a large number of new phone installations which, however, constantly leave wide gaps in the demand and in the real needs of the country.

Chart 1: Number of applications for new telephone installations
which were submitted and approved, and are pending (au-
tomated switchboards)

Years	Submitted	Approved	Pending (including previous years)
1973	232,251	203,033	137,803
1974	230,227	161,492	214,473
1975	165,603	148,020	240,396
1976	229,023	131,787	347,765
1977	266,326	129,078	498,722

Chart 2: Number of applications for new telephone installations
which were submitted and approved, and are pending
in the capital area

Years	Submitted	Approved	Pending (including previous years)
1973	106,068	88,742	54,562
1974	101,486	73,645	87,965
1975	73,394	60,701	102,428
1976	91,090	43,823	154,339
1977	104,298	59,275	201,910

Chart 3: Length of time applications have been pending in certain Nomes

Capital area	from	1 Jan 1973
Salonica area	"	11 Aug 1971
Rest of Attiki	"	14 Apr 1973
Rest of Salonica	"	24 Mar 1971
Voiotia Nome	"	28 Nov 1971
Evvoia Nome	"	7 Dec 1971
Kerkyra Nome	"	8 Dec 1975
Irakleion Nome	"	9 Oct 1973
Drama Nome	"	10 Feb 1973
Serrai Nome	"	29 May 1972
Argolis Nome	"	7 Aug 1973
Korinthia Nome	"	28 Dec 1970
Fthiotis Nome	"	13 Sep 1971
Khios Nome	"	18 Sep 1973
Dodekanisos Nome	"	21 Oct 1973
Ioannina Nome	"	11 Jan 1971
Zakynthos Nome	"	10 Mar 1975

Chart 4: Domestic long distance calls (in units)

Years	Automated switchboard	Manual switchboard	Total
1973	189,954,218	31,292,974	221,247,192
1974	238,146,643	23,797,865	261,944,508
1975	257,588,033	15,870,830	273,458,863
1976	296,572,337	15,070,952	309,643,289
1977	336,000,000	11,270,000	347,270,000

Chart 5: Duration of out-going international calls in first minutes

Years	Automated switchboard	Manual switchboard	Total
1973	21,227,033	5,159,681	26,386,714
1974	26,464,900	5,995,543	32,460,443
1975	31,992,164	5,746,300	37,738,464
1976	44,149,893	6,145,450	50,295,343
1977	54,783,546	5,841,298	60,624,844

Chart 6: Number of applications for new Telex installations which were submitted and approved, and are pending

Years	Capital			Entire Country			
	Subm.	Appr.	Pending	Years	Subm.	Appr.	Pending
1973	776	750	26	) 1973	1,039	1,013	26
1974	837	863	—	) 1974	987	1,012	1
1975	136	48	88	) 1975	188	89	100
1976	526	100	514	) 1976	670	123	647
1977	1,259	905	868	) 1977	1,654	1,182	1,119

END